

EXHIBIT G

Page 1

1 UNITED STATES DISTRICT COURT
2 WESTERN DISTRICT OF NEW YORK
3 -----X
4 CAROL S. MARCELLIN, Individually, and as
5 Co-Administrator of the Estate of Charles E.
6 Hollowell, deceased, and JESSICA HOLLOWELL-MCKAY,
7 as Co-Administrator of the Estate of Charles E.
8 Hollowell, Deceased,

9 Plaintiffs,
10 -against-
11 HP, INC. and STAPLES, INC.,
12 Defendants.
13 -----X

14 Civ. No: 1:21-cv-00704-JLS
15 Job No: P1-7232365
16 -----X

17 Virtual Deposition
18 March 24, 2025
19 10:03 a.m.
20

21 DEPOSITION of DONALD GALLER, P.E., an Expert
22 Witness, taken by the Plaintiff, pursuant to Notice,
23 held at the above-mentioned time and place, before a
24 Court Reporter and Notary Public of the State of New
25 York and New Jersey.

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1 A P P E A R A N C E S:

2

3

4 FARACI LANGE, LLP
5 Attorneys for Plaintiffs
6 1882 South Winton Road - Suite 1
7 Rochester, New York 14618
8 BY: STEPHEN G. SCHWARZ, ESQ.
9 MATTHEW F. BELANGER, ESQ.
10 JOSH MANKOFF, ESQ.

11

12 COUGHLIN BETKE, LLP
13 Attorneys for Defendants
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15 Boston, Massachusetts 02110
16 BY: BENJAMIN H. LEVITES, ESQ.

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16 ALSO PRESENT:

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6	Experimental Study on Thermal Runaway and Vented Gases of Lithium-Ion Cells (7 pages)	9
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1 F E D E R A L S T I P U L A T I O N S
2

3 IT IS HEREBY STIPULATED AND AGREED by
4 and between the attorneys for the
5 respective parties herein:

6
7 THAT the sealing, filing and
8 certification of the within deposition be
9 waived;

10
11 THAT such deposition may be signed and
12 sworn to before any officer authorized to
13 administer an oath, with the same force and
14 effect as if signed and sworn to before the
15 officer before whom said deposition is
16 taken.

17
18 IT IS FURTHER STIPULATED AND AGREED
19 that all objections, except as to form, are
20 reserved to the time of trial.

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1 VIDEOGRAPHER: Good morning, everybody.

2 We are going on the video record at
3 approximately 10:03 a.m. on March 24th,
4 2025.

5 Please be advised audio and video
6 recording will continue to take place,
7 unless all parties agree to go off the
8 video record.

9 This is the video-recorded deposition
10 of Donald Galler in the matter of Carol S.
11 Marcellin, et al. versus HP, Inc. and
12 Staples, Inc. filed in the United States
13 District Court Western District of New
14 York, Case Number 1:21-cv-00704-JLS.

15 This deposition is being conducted
16 remotely using virtual technology.

17 My name is Mike Pellegrino. I am the
18 videographer. Our court reporter today is
19 Eva Kaflinski.

20 Appearances will be notated on the
21 stenographic record.

22 Will our reporter, please, swear in the
23 witness.

24 -ooOo-

25

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1 DONALD GALLER,
2 after having first been duly sworn by a Notary
3 Public of the State of New York, was examined and
4 testified as follows:

5 BY THE COURT REPORTER:

6 Q State your name for the record.

7 A Donald Galler.

8 Q State your address for the record.

9 A 15 Birchwood Drive, Bedford,
10 Massachusetts 01730.

11 (Documents and photographs were
12 pre-marked as Plaintiff's Exhibit 1
13 through Plaintiff's Exhibit 23 for
14 identification, as of this
15 date)

16 EXAMINATION BY

17 MR. SCHWARZ:

18 Q Good morning, Mr. Galler.

19 My name is Steve Schwarz. I am the
20 attorney for the Plaintiff, who is going to be asking
21 you questions today.

22 And I believe from looking at the
23 materials that were provided, you've been through
24 depositions before, correct?

25 A Correct.

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1 Q And do you know approximately how many
2 you've done?

3 A I think maybe about 15, but I haven't
4 counted them recently.

5 Q Okay.

6 So, you understand the ground rules.

7 And one of the most important things is
8 that we try to let each other finish what we are
9 saying before the other one starts speaking to make
10 Eva have an easier time today of taking it all down.

11 All right?

12 A Right.

13 Q The thing is you can take a break at
14 any time you want. We will try to break every hour.
15 But the only limitation on that is if I've asked you
16 a question, you got to answer that, and then we can
17 take a break. But any time you need a break, just
18 let us know.

19 Okay?

20 A Thank you.

21 Q Mr. Galler, my understanding is that
22 you are a research engineer at MIT Material Science
23 Welding Laboratory; is that correct?

24 A That's correct. Except I am not sure
25 that it's a welding laboratory anymore. But I am a

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1 research engineer. It is my job classification.

2 Q Okay.

3 And can you tell me about that facility
4 and what type of research you do there?

5 A Well, I used to do welding research,
6 which is why my title is research engineer. They
7 never changed my title. But what I have been doing
8 for the last several years is taking care of a scan
9 and electron microscope facility. And it's a -- it's
10 a --

11 I am a part-time employee. I work
12 about one day a week. That's my status as far as MIT
13 is concerned. I work one day a week.

14 Q Okay.

15 And when did you begin that limited
16 schedule of one day a week approximately?

17 A Well, I was never a full-time employee.
18 So, I was --

19 I think at some point I spent 50
20 percent of the time from 1995 to about 2005. And
21 some time after that, I was --

22 Changed my position so that although my
23 job title was the same, research engineer, just the
24 job classification as far as sort of salary goes.
25 And I became the lab manager for this small ESM, a

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1 scanning electron microscope lab. And when I did
2 that --

3 At some point when I did that, I became
4 an employee at one day a week.

5 Q So, let's go back to the time period
6 when you were a half time employee for MIT.

7 Can you tell me what the nature of your
8 research was at that time?

9 A We were doing --

10 So, I was attached to a welding
11 research lab and welding research and processing of
12 metals with electrical energy. So, being an
13 electrical engineer, it was helpful for the lab to
14 have a part-time electrical engineer. In other
15 words, there were grad students doing various
16 research projects and I would help them as far as the
17 electrical parts of their project.

18 Q You mentioned welding several times. I
19 am just trying to understand.

20 How does the electrical engineering
21 aspect of your training fit in with welding when you
22 were doing that research?

23 Can you just explain that a little bit
24 better?

25 A Most of -- most welding these days is

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1 done by electric arc. And the students were
2 experimenting with different types of arc processes.
3 So, different sources of energy generate the arc.
4 And my original technical connection with the lab
5 became -- was much earlier before I was an employee.
6 I built some power supplies for welding research.
7 So, these converted utility power, through a
8 three-phase power usually, to a DC pulse form that
9 could be used for arc welding. And so, the arc
10 welding process were experiments using the arc
11 welding process were done with various forms of
12 electrical power mostly EZ or pulse EZ. And then,
13 that meant it was really useful for me to be around
14 to help the students.

15 And in the metals processing business,
16 if they frequently did the experiments where they
17 needed a certain type of power, maybe they needed 480
18 power or a 208 power and at a certain level, and I
19 would help them make changes in equipment that
20 allowed them to use whatever process they were doing.
21 And because I was an electrical engineer, it was --

22 They could all do it. Make the
23 changes. Buy the equipment. But it was something I
24 was helping them with.

25 Q Okay.

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1 Did you actually teach any classes?

2 A I think that I taught a class once on
3 welding power supplies, but that's it. In other
4 words, it was a special class arranged for graduate
5 students that were working in the labs that I was
6 attached to. It wasn't in the curriculum. In other
7 words, I was never officially on the faculty, if
8 that's what you are asking.

9 Q Yeah. Okay. Great.

10 And during that time period from '95 to
11 2005 when you were a 50 percent employee at MIT in
12 the welding lab, did you have some other employment
13 that took up your other 50 percent?

14 A I was always doing --

15 When I started at MIT, which is around
16 1995, I was already doing some independent consulting
17 work along the lines of the matter we are here today
18 for. And so, I had been attached or hired by a
19 couple of different consulting companies. And at
20 some point when I left them, I had clients of my own.
21 So, I always had two roles. One was working as an
22 MIT employee and then as an independent consultant
23 for supporting the legal activities.

24 Q So, your academic training is in
25 electrical engineering; is that correct?

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1 A That's correct.

2 Q And prior to 1995, what employment did
3 you have?

4 A When I got out of grad school in the
5 1980s, I worked for a small consulting company called
6 Alexander Cosco Incorporated with an ex MIT professor
7 from the Electrical Engineering Department and four
8 or five people. And we did a couple of different
9 kinds of work.

10 One of the things we did was we helped
11 industry and, I guess, government agencies that were
12 having trouble with high power electrical equipment
13 like subway systems or transmission systems. And so,
14 we did some work along those lines. And then, also
15 we were involved in product like litigation. In
16 other words, like product liability work for
17 insurance companies and lawyers. And so, I worked
18 for them until 1988.

19 Then at some point -- I think it was
20 around '88 -- we were purchased by a company called
21 Failure Analysis Associates. Failure Analysis
22 Associates later changed their name and became
23 Exponent. So, what happened was at the time the
24 purchase was made, there was just four, like,
25 engineers; a boss and one or two people, maybe

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1 support staff. That entirety got --

2 That entire company got purchased by
3 Failure Analysis Associates and we moved into their
4 facility, which was located in Westborough,
5 Massachusetts. And I worked for them until about
6 1995. And then, I left. I had a brief transition at
7 another company for a year. And then, I started
8 working at MIT part-time. That was about 1995.

9 Q Thank you.

10 Now, when you worked for the consulting
11 company and then for the Failure Analysis company,
12 did you have a specialty of the type of cases that
13 you would get involved with?

14 A Electrical failures of some sort.

15 Q And did you have any professional
16 training or experience in fire investigation?

17 A I think that a lot of my product
18 liability work involved fires, but I didn't have any
19 formal training in fire investigation. And I still
20 don't. In other words, I am not a certified fire
21 investigator or anything like that, if that's what
22 you are asking.

23 Q So, your involvement in any types of
24 investigations of fire was to look at the electrical
25 aspects of whether that was the cause of the fire?

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1 A Correct.

2 Q And have you had any specialized
3 training in that aspect of investigation with regard
4 to looking at the potential electrical causes for
5 fires?

6 A In terms of a certified --
7 I am not sure what your question is.
8 Do you mean in terms of a certification
9 or --

10 Q Have you had any formal training, would
11 be the question first.

12 And then, I am going to ask you whether
13 you've had any sort of on-the-job training for that
14 type of investigation with fire investigators.

15 A I think my answer is I have not --
16 I haven't had any formal training in
17 how electrical things fail and cause fires. So, I
18 haven't taken any courses in that area, if that's
19 what you are asking.

20 Q Right. That's the first question.
21 And then, have you learned --
22 During your consulting career, did you
23 work with fire investigators to obtain some
24 on-the-job type of training of looking at electrical
25 causes for fires?

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1 A I was always working with a fire
2 investigator. So, I would typically --

3 What would happen is a lawyer would
4 contact me. There would be a fire in the building.
5 They would connect me to a fire investigator. So, I
6 was always working on a team, so to speak, where
7 there was a fire investigator and maybe somebody else
8 if there was a specialty involved like a chemical
9 engineer or something like that.

10 And so, I was always working with fire
11 investigators. And a lot of them were of the type
12 that were sort of academic oriented in a sense they
13 were --

14 In other words, they would always --
15 they would always ask me electrical questions, but
16 try to make sure that whatever I gave them back as
17 the answers satisfied whatever electrical aspects of
18 the investigating code were required.

19 Q In those consultations, did you
20 actually visit fire scenes and do arc mapping or arc
21 surveys to look for electrical causes of fires?

22 A Yes.

23 Q And was that the typical process, then,
24 when you were hired to look at a potential electrical
25 cause of a fire that you would visit the scene and do

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1 that sort of analysis?

2 A It was typical that I would visit the
3 scene if the scene was available depending on what
4 time sort of in the process I got hired. In other
5 words, sometimes a lawyer would call me after the
6 scene was already examined and wasn't available
7 anymore and they were getting ready to do laboratory
8 exams. Maybe they had collected a bunch of
9 electrical things and somebody else did the arc
10 mapping because I just then got involved. So,
11 somebody else did it at the scene. But there was no
12 scene work involved. All the work on my part started
13 when the lab exams took place.

14 Q Would you agree with me that it would
15 be preferable for anyone in your position looking for
16 electrical causes of fires to actually visit the
17 scene when that's possible?

18 A Yes.

19 MR. LEVITES: Objection.

20 Q And with regard to the other scenario
21 that you described where you were retained after that
22 initial scene investigation, is it true then that you
23 relied on the fire investigators that did the scene
24 investigation and chose certain items for you to
25 evaluate and you weren't involved actually in that

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1 process of picking which items should be evaluated
2 subsequently in a laboratory analysis?

3 A I think that's all correct if I am
4 contacted after the scene has been -- what do they
5 usually call it -- released, given back to the
6 homeowner or building owner or something and then
7 reconstruction starts. So, if I get involved after
8 that, I have to rely on what people had done before.

9 Q And so, the fire investigators in those
10 scenarios would choose the electrical items that they
11 think are potential causes of the fire and they would
12 bring them back to a lab and then you would have a
13 chance to evaluate them there?

14 A Correct.

15 Q And that's what happened in this case
16 also, correct?

17 A Correct.

18 Q The fire investigator for HP, Greg
19 Gorbett, was the one who made, with the other fire
20 investigators, made selections of various items that
21 they thought could have been a potential cause of the
22 fire and they then provided a laboratory
23 investigation and you were invited to that?

24 A That's correct.

25 MR. LEVITES: Objection.

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1 Q Now, you also have a business, I
2 believe, called Electrical Engineering Solutions?

3 A Correct.

4 Q Is that your now independent consulting
5 company that you have?

6 A Correct.

7 Q Is that a formal company or is it just
8 a website that you did that kind of individually
9 without having a corporate entity or some other type
10 of business entity?

11 A It's a business. It's not a
12 corporation. I don't have --

13 I am a sole proprietor. I don't have
14 employees.

15 Does that answer some of your
16 questions?

17 Q Sure. That's what I meant. I know it
18 wasn't a very artfully crafted question so I
19 apologize for that.

20 So, you are an independent person that
21 has a consulting business now that you call
22 Electrical Engineering Solutions?

23 A That's correct.

24 Q How long have you been operating that
25 sole proprietorship?

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1 A Since about 1995 when I left Exponent
2 around that time.

3 Q Now, on your website, I took a look at
4 it, and you have something called "The Project List"
5 on your website.

6 Are you familiar with that?

7 A I don't remember what is all in it, but
8 there is a project list.

9 Q And on that project list it says
10 computers, laptops, monitors and power supplies.

11 Can you just give us an idea of your
12 experience with Electrical Engineering Solutions and
13 projects involving computers, laptops and monitors
14 and power supplies prior to this case?

15 A Well, for a number of years I have been
16 doing work for Hewlett Packard. I don't think I did
17 much work for any of the other major companies.
18 Actually, prior to doing work with them, I did some
19 work for Lucent Technologies where I was
20 investigating not fire investigations but doing
21 patent investigations. So, it was intellectual
22 property work. And I bought a number of computers
23 made by good people, took them apart, did tests on
24 them. And so, we were investigating certain parts of
25 software. Like one of the things I remember was they

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1 had patents on how video displays worked, how the
2 computer handled the video display.

3 So, early on, say, in the '95 to 2000
4 frame I was doing a lot of work for Lucent. And
5 then, I started doing work for HP and when I started
6 doing work for HP, of course, there were desktop
7 computers and laptop computers and a variety of
8 things like that. And handled the power supplies.
9 Meaning, the thing that looks like a little brick
10 that plugs in the wall that powers your laptop,
11 powers your printer; that sort of thing.

12 And I also did a lot of work on
13 printers for them. Mostly the consumer style
14 printers like ink jet printers and laser printers
15 that you would put on a desk.

16 Q Now, your work for HP then, that began
17 in approximately when?

18 A I guess it began in around 2000s.

19 Q And with regard to your projects for
20 HP, how many of them approximately dealt with fires
21 or malfunctions that caused fires?

22 A Well, the malfunctions that allegedly
23 caused fires, many of them. So, I don't have a
24 number to give you.

25 Q How many of --

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A I don't -- I don't really ever --

I am sorry. I haven't been asked this question before in these terms. So, I don't have a good number. If I had to estimate, it would be a pretty big estimation. Probably more than 20 and less than 100, but I can't tell you exactly how many it's been.

11 | 0 So, you have --

12 Your estimate, if I understand
13 correctly, is that between 20 and 100 times you have
14 been asked by HP to look at lithium-ion battery
15 fires?

16 A I am just trying to think if I did any
17 work for anyone else along those same lines. I've
18 also looked at lithium-ion fire allegations in
19 consumer --

Well, I guess I would call them tools.
Lithium-ion battery operated tools as well. Maybe a
dozen of those or something as well. And --

23 I am sorry.

24 Does that answer your question?

Q Well, I think you kind of diverted to a

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1 different question, which is fine.

2 So, some of the 20 to 100 involved
3 tools that had lithium-ion chargeable batteries,
4 rechargeable batteries?

5 A Correct.

6 Q And some of them involved laptop
7 computers made by HP?

8 A Correct.

9 Q And can you tell me approximately how
10 many of the fires that you investigated with
11 lithium-ion battery potential causes of fires that
12 you investigated for HP?

13 A I -- I think 100 would be a large
14 overreach, now that I am thinking about. It's sort
15 of more like 20 to 50. I don't --

16 Like I said, I don't keep track of them
17 that way. So, I don't have a good recollection as to
18 how many there really are or were.

19 Q I am just --

20 I am confused, and I apologize. So,
21 let me just restate it to make sure I am
22 understanding.

23 When you said your estimate was really
24 20 to 50, does that include the power tools or is
25 that limited to laptop computers?

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1 A I think that's probably everything.

2 Q Okay.

3 So, now I am going to ask you of that
4 20 to 50 that involve lithium-ion batteries of any
5 type, how many of them approximately dealt with
6 laptop computers?

7 A Probably 20.

8 Q Okay.

9 A Thirty. Twenty. Thirty. I am not
10 sure.

11 Q And of that 20 to 30 HP laptop computer
12 fires that you investigated, how many did you
13 determine approximately that the battery cells or
14 more than one of them went into thermal runaway?

15 MR. LEVITES: Before you go on, did you
16 say was the 20 to 30 HP or is that all
17 manufacturers?

18 MR. SCHWARZ: I thought he said 20 to
19 30 were HP laptops because he didn't
20 remember doing any laptops other than HP.

21 Q But Mr. Galler, you can correct me if I
22 am wrong on that.

23 A No. I think that's about right. But
24 again, it's a rough number because I don't keep track
25 of them that way. And I think your question --

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1 Can you repeat the question?

2 Q Sure.

3 Of the laptop fire investigations you
4 did for HP involving lithium-ion batteries, how many
5 of the battery -- how many of the cases involved
6 thermal runaway of a lithium-ion battery cell?

7 A I think it's a fairly large percentage.
8 Maybe 80 percent of them. I should say that -- that,
9 you know, you are asking the question in terms of HP,
10 HP. But as in this case that we are discussing
11 today, we frequently found non HP battery packs in HP
12 laptops. So, although there may have been a large
13 percentage of them where the issue was thermal
14 runaway, many of them were batteries not supplied by
15 HP.

16 Q So, we are going to talk about
17 unauthorized battery packs or counterfeit battery
18 packs, but that's what you are referring to.

19 In other words, HP is not a battery
20 manufacturer, correct?

21 A Well, it's hard to answer that. Let me
22 just say that HP is not a battery manufacturer. That
23 is correct. They hire companies, Samsung and LG and
24 companies like that, to make the battery packs. And
25 usually if, let's say, LG makes a battery pack, they

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1 use LG batteries. They are --

2 HP is not making them, but the packs
3 are supplied by one of their selected vendors.

4 Q Right.

5 So, HP provides a specification to
6 various vendors -- and LG, being one of them -- and
7 it's LG that would make the battery packs for the HP
8 computers when they are new, correct?

9 A That's right.

10 Now, I think there are some that vary a
11 little bit from that. In other words, I think there
12 are some pack manufacturers that use batteries that
13 are -- that are --

14 In other words, it's LG batteries in a
15 pack made by somebody else, but all of that is done
16 under the auspices of a specification that HP
17 provides.

18 Q Okay.

19 And you have been doing these
20 investigations for HP since 1995?

21 A No.

22 I think I started doing work for HP
23 around the year 2000. And it's probably only been
24 the last ten years; maybe slightly less than that.
25 But not that whole time period, 20-year time period.

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1 Lithium-ion battery packs or lithium-ion batteries
2 weren't really very common. So, it's sort of more in
3 the last ten years I have been doing more work on
4 lithium-ion batteries where fires were involved and
5 lithium-ion batteries were one of the suspected
6 causes.

7 Q So, in the cases that you've
8 investigated for HP of thermal runaway and
9 lithium-ion batteries in laptop computers, can you
10 give me a percentage of those that turned out to not
11 be authorized battery packs that were involved in
12 those thermal runaway reactions?

13 A I am not sure that I remember any that
14 were authorized HP batteries. That they all seemed
15 to be unauthorized HP batteries. It was batteries
16 supplied by some other vendor.

17 Q In your --
18 Withdraw that question.
19 When did you first --
20 What year was it approximately that you
21 first saw that scenario where you investigated an HP
22 laptop fire and found that the battery pack was an
23 unauthorized battery pack that went into thermal
24 runaway?

25 A Pardon me. I am just thinking.

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1 Q Take your time.

2 A I can't really be positive but there is
3 one situation that I recall where there was a --
4 I guess your question was when was
5 that. So, probably ten years ago.

6 Q Okay.

7 Now, there is --

8 I believe in your report you made a
9 list of some of the items that you reviewed and one
10 of the items was a deposition transcript of a Lee
11 Atkinson.

12 Do you recall that?

13 A Yes.

14 Q Is Mr. Atkinson someone that you've
15 worked with on other cases involving HP laptop
16 battery fires that involved a counterfeit battery
17 pack?

18 A I don't work directly with him, but he
19 is an HP employee. So, sometimes --

20 And this could be with respect to
21 batteries or if there's something else, let's say, in
22 a laptop computer, I have a question. I am working
23 with an HP attorney. And they get Lee Atkinson
24 involved to try to answer questions that I have.

25 Q Okay.

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1 But how many times --

2 How many cases have you interacted with
3 Mr. Atkinson would you say of these 20 to 30
4 counterfeit battery pack thermal runaway HP
5 investigations you've done?

6 A Maybe five or six.

7 Q And have you ever discussed with
8 Mr. Atkinson the prevalence of these HP laptop
9 battery fires that involve counterfeit battery packs?

10 MR. LEVITES: Objection.

11 You can answer.

12 A I don't think I ever discussed that
13 with him. And when you say discussed, like, as if --

14 As I was trying to explain, usually
15 what happens is I will have questions and
16 conversations with HP's attorneys and they say, "Oh,
17 well, we will ask Lee that question." Lee Atkinson.
18 "We will ask Lee Atkinson that question." Or "Can
19 you e-mail me your questions and I will send them on
20 to Lee."

21 I usually don't have direct commun --

22 I don't remember there ever being a
23 phone call where he was on the phone call. There
24 might have been one, but that's uncommon.

25 Q In the 20 to 30 cases that you've

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1 investigated of fires that were believed to have
2 started in HP laptop computers involving counterfeit
3 or unauthorized battery packs, did you perform an
4 analysis of the battery pack, itself, or what was
5 left of it?

6 A Yes.

7 Q And in your review of those
8 unauthorized counterfeit battery packs that had gone
9 into thermal runaway, did you make a determination in
10 any of those cases as to whether the various safety
11 devices that were intended under the HP specification
12 were actually enabled on those counterfeit battery
13 packs?

14 A Almost always, I think.

15 Q Okay.

16 A That's what I am looking at to make a
17 determination that they are authorized battery packs.

18 Q So, one of the things that you utilized
19 to make that determination is whether the battery
20 pack meets the HP specification?

21 A Correct.

22 Q And the HP specification -- we are
23 going to go into that for this particular laptop --
24 but generally, HP would require certain safety
25 mechanisms in the battery pack that would either

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1 prevent or at least make thermal runaway much less
2 likely, correct?

3 MR. LEVITES: Objection.

4 You can answer.

5 A That is correct.

6 And then, there are other safety
7 features. I would say construction features that are
8 safety related that HP requires also.

9 Q Right. But I am just going to stick
10 with thermal runaway for a moment.

11 A Okay.

12 Q And there were under HP specifications
13 certain safety features that were specifically
14 designed to prevent the batteries from being
15 overcharged, going over voltage, cell imbalance or
16 over temperature, correct?

17 A Correct.

18 MR. LEVITES: Steve, before we go on,
19 are we --

20 We are going back and forth between the
21 battery, the cases that he worked on
22 generally and this case?

23 MR. SCHWARZ: We are still working on
24 the cases that he worked on generally.

25 MR. LEVITES: So, you are asking about

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1 all these features in all the 20 to 30
2 cases?

3 MR. SCHWARZ: Right.

4 MR. LEVITES: Okay.

5 Q And I think you answered my question.
6 So, that's fine.

7 And in the battery -- the counterfeit
8 or unauthorized battery packs in the 20 to 30 cases
9 that you looked at, can you tell me what percentage
10 lacked the safety features that we've just discussed
11 that were intended to prevent or diminish the chances
12 of thermal runaway?

13 A I think the best I could tell you is
14 more than half.

15 And that there is a class of them where
16 at least one where I know that there was another
17 construction feature not necessarily related to
18 thermal runaway prevention, but it was a construction
19 feature where we could tell that the packs, in
20 general, were not HP packs. In other words, they had
21 been replaced in some fashion. In other words,
22 laptops were by HP. And when we looked at the
23 batteries, the batteries had construction features
24 that were not according to the HP specification but
25 not necessarily related to thermal runaway

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1 prevention.

2 Q Okay.

3 But I wanted to again make an
4 assumption that of the ones you looked at where you
5 actually determined that the safety features designed
6 to prevent or reduce the chances of thermal runaway
7 were not present in the unauthorized battery pack.
8 And I think you said about half of them.

9 Was that correct?

10 A That's about right.

11 Q Okay.

12 Now, with regard to that half, did you
13 make some determination that the lack of that safety
14 feature played a role in the battery pack going into
15 thermal runaway?

16 MR. LEVITES: Objection.

17 You can answer.

18 A I think that in some of these, I notice
19 that the, you know, the batteries --

20 We knew the batteries had gone into
21 thermal runaway or had physical characteristics
22 consistent with thermal runaway. And then, we also
23 noticed -- meaning I also noticed -- that the safety
24 features were missing. Now, the thermal runaway
25 sometimes has some physical sort of chemical, I

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1 guess, characteristics. Chemical is not the right
2 word. Structural characteristics. Having to do with
3 the way the cell expands. The physical damage to the
4 cell may or may not be consistent with a thermal
5 runaway. And because that's a specialty that is
6 really not --

7 That's sort of chemistry and physics
8 oriented, I frequently get involved with other people
9 who are specialists in that area. One of them is
10 involved in this case, a Dr. Quinn Horn from
11 Exponent. And so, I will say, "Gee, this one looks
12 funny. It doesn't have the right features on it."
13 And then the lawyers go, "Well, we will ask Quinn to
14 look at the battery to see whether he thinks the
15 cells went into thermal runaway." The cells could be
16 damaged, but not necessarily be in thermal runaway.
17 And that determination isn't made by me. It's made
18 by somebody with Dr. Horn's background.

19 Q So, is it fair to say, then, that you
20 are not an expert in thermal runaway?

21 A I guess I'm an expert in at least
22 looking at the electrical system of the Battery
23 Management Unit that helps prevent thermal runaway by
24 virtue of those characteristics that are embodied in
25 the HP specification.

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1 But in terms of looking at the cell,
2 let's suppose there is a battery and a fire or an
3 alleged fire and there were just physical cells
4 around, but no BMU anymore; which happens sometimes,
5 right. So, somebody says, "Well, did those cells go
6 into thermal runaway?" So, looking at the cell
7 structure, itself, is not a thing that I do. That's
8 something that Dr. Horn does. I am not sure if I've
9 answered your question.

10 Q I think you are getting there.

11 So, if I understand your answer then,
12 your specialty is more looking at the battery
13 management system and looking at the various safety
14 features that were intended by HP and whether they
15 are present in the unauthorized battery pack?

16 A That's right. You know, the electrical
17 engineering of looking at the BMU and then
18 attachments of the cells to the battery to the BMU,
19 Battery Management Unit, that's the electrical
20 engineering part.

21 The physics and chemistry part has to
22 do with how does the cell expand and get damaged and
23 that sort of thing. So, that's a different area.
24 And I rely on somebody like Dr. Horn for that.

25 I am looking at the electrical stuff

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1 that the battery is connected to the BMU with.

2 Q Got it.

3 Now, in the cases --

4 In the 20 to 30 cases and then you said
5 about half of them that you found the unauthorized
6 battery packs didn't have the safety features that
7 were in the specification from HP, did you inform HP
8 of your findings in those cases?

9 MR. LEVITES: Objection.

10 You can answer.

11 A Yes.

12 Q So, in other words, you said about ten
13 years ago you first found one of these unauthorized
14 or counterfeit battery packs that lacked safety
15 features.

16 And when you found that, you let HP
17 know that was what you found?

18 A Correct.

19 MR. LEVITES: Objection.

20 Q And for the other number of situations
21 you found the same way, each time you let HP know
22 that there are these counterfeit battery packs that
23 people are buying, don't have safety features?

24 MR. LEVITES: Objection.

25 You can answer.

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1 Q You let them know that, correct?

2 A Yes, certainly. That's correct.

3 Q Okay.

4 And that began, you said, somewhere
5 around ten years ago?

6 A Again, it's a little hard for me to
7 remember when the first one was, but I think it
8 was --

9 It wasn't 15 years ago and it wasn't 5
10 years ago.

11 Q Okay.

12 Now, Mr. Galler, do you have any
13 experience, any research experience, with lithium-ion
14 batteries where you would do some sorts of
15 experiments to put them into thermal runaway?

16 A No, I don't think I've ever done any of
17 those experiments.

18 Q And you looked at your CV, and I don't
19 think you published any papers that involved
20 lithium-ion batteries at all, correct?

21 A I think that's correct. Yes.

22 Q Now, if you could pull out your binder,
23 and hopefully it will stay together for our
24 discussions today --

25 A Okay.

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1 Q I want you to turn to tab one, which I
2 have marked as Galler Exhibit 1.

3 A Bear with me because I am not sure how
4 this is all going to fit on my desk here.

5 Yes.

6 Q Now, Exhibit 1 -- that is in tab 1 --
7 is your report in this case, correct?

8 A Correct.

9 Q And on the first page you list a number
10 of things that you looked at, correct?

11 A Correct.

12 Q Well, first of all, you list that you
13 attended an evidence examination at FRT in October of
14 2000?

15 A Yes, you found the typo. And I was
16 aware of that recently, but obviously not before I
17 wrote this.

18 Q You just got the wrong date, right?

19 A Yeah.

20 I think it's 2020.

21 Q It is 2020?

22 A Right.

23 Q So, I didn't --

24 That's not why I called it out. Sorry.

25 A That's okay.

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1 Q I wasn't trying to --
2 I make plenty of typos, believe me.
3 But in any event you attend an
4 examination at FRT, which is in Sodus, New York,
5 correct?

6 A Correct.

7 Q And that examination was of materials
8 that were collected at the fire scene back in January
9 or February of 2020, correct?

10 A Correct.

11 Q At FRT they did x-rays of some of that,
12 materials that were brought back, including the HP
13 laptop, and they also did a CT scan, correct?

14 A Correct.

15 Q And you looked at the images that were
16 created by those two tests?

17 A Correct.

18 I am not sure that I had CT scan files
19 at the exam. I think that was done afterwards. But
20 I did get them --

21 I got them.

22 Q So, you looked at them when you got
23 them whenever that was, right?

24 A Yeah.

25 Q Then you list some other items and the

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1 third item on there is fire scene photographs by Greg
2 Gorbett?

3 A Yes.

4 Q And Greg Gorbett was the fire
5 investigator, the professional fire investigator,
6 that was hired by HP to examine the fire scene,
7 correct?

8 MR. LEVITES: Objection.

9 A That's right.

10 Q And Mr. Gorbett took photographs?

11 A Correct.

12 Q And he also was involved in the
13 selection of the materials that were brought back to
14 FRT that you examined in October?

15 MR. LEVITES: Objection.

16 A Correct.

17 MR. SCHWARZ: What is the nature of
18 your objection to that, Ben, so I could
19 know?

20 MR. LEVITES: There was a suggestion
21 contained within your question.

22 MR. SCHWARZ: What was the suggestion?

23 MR. LEVITES: Could you read the
24 question back?

25 (Whereupon, the

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1 following question was
2 read back by the court
3 reporter:

11 MR. LEVITES: Right. So, there is a
12 suggestion in respect to Mr. Gorbett's role
13 vis-a-vis the other investigators.

That is the nature of my objection.

15 MR. SCHWARZ: I asked him if he was
16 involved in that process, not whether he
17 did that unilaterally. So, I don't think
18 that is a valid objection.

19 I would appreciate you keep your
20 objections to ones that are valid and not
21 to just disrupt my questioning.

22 Q So, Mr. Galler, just to repeat that,
23 your understanding is that Mr. Gorbett was at the
24 scene on behalf of HP to do a fire investigation,
25 correct?

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1 A Correct.

2 Q And Mr. Gorbett and the other fire
3 investigators that were present at the scene selected
4 certain items from the scene to bring back to FRT to
5 do a more thorough investigation using these other
6 imaging devices, correct?

7 A I presume that that's correct although
8 I wasn't there. So, I don't know --

9 As far as I know --

10 I am not sure what Greg Gorbett's
11 involvement was in that. So --

12 Q So, did you think --

13 A Normally.

14 Q I'm sorry.

15 Go ahead.

16 A Normally, he is involved in the
17 selection of things to be retained. So, that's
18 consistent with his, you know, involvement.

19 Q In other HP cases that you have been
20 involved with, have you worked with Mr. Gorbett?

21 A Yes.

22 Q And Mr. Gorbett is a nationally renown
23 fire investigator, correct?

24 A That's correct.

25 Q And in the other cases that you were

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1 involved with, you had the opportunity to talk to Mr.
2 Gorbett in your analysis of the case to get his input
3 on what he saw at the scene?

4 A That's frequently common. Not always,
5 but frequently common.

6 Q So, that's my question.

7 Did you have an opportunity to talk to
8 Mr. Gorbett at all about his investigation of the
9 source of the fire in this case?

10 A I don't think I ever spoke to him about
11 this case.

12 Q Now, Mr. Gorbett was hired by HP to
13 investigate the source of the fire and went to the
14 scene, correct?

15 A That's correct.

16 MR. LEVITES: Objection.

17 Q And you were provided with photographs
18 that were taken by Mr. Gorbett?

19 A Correct.

20 Q Were you provided with the notes that
21 Mr. Gorbett took with regard to his findings and
22 conclusions based upon his investigation?

23 A I don't -- I don't think so.

24 Q And you weren't permitted to talk to
25 Mr. Gorbett?

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1 MR. LEVITES: Objection.

2 A I didn't say that. I just said that I
3 don't remember talking to him about what he found at
4 the scene.

5 And part of this part of that issue of
6 talking to Gorbett, for me, if I am on a scene with
7 Greg, usually we talk afterwards while we are still
8 at the scene but away from everybody else, like, what
9 did we think. I didn't have an opportunity to do
10 that because I wasn't at the scene.

11 Q Right.

12 So, you weren't at the scene, but Mr.
13 Gorbett was and that gave him a perspective that you
14 didn't have?

15 A I presume so, yes.

16 Q But you never talked to him to Mr.
17 Gorbett to find out what that perspective was?

18 A I don't -- I don't recall doing that.
19 That's right.

20 Q Did you find it odd that Mr. Gorbett
21 did not produce any written materials from his
22 investigation in this case?

23 MR. LEVITES: Objection.

24 You can answer.

25 A Well, first of all, I am not sure he

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1 didn't provide any written materials. Usually I get
2 his photographs and some field notes which are, like,
3 sketches of the room in question and things like
4 that. I am not sure if that answers the question
5 though. But I may have also gotten his sketches.

6 Q You may have?

7 A I just don't remember whether I got
8 them or not.

9 Q I would like to make a request then
10 that you look for those sketches and any other
11 information you got from Mr. Gorbett and you supply
12 that to your attorney to supply that to us?

13 A Okay.

14 I am just going to make a note of
15 things you are requesting.

16 Okay.

17 Q Thank you.

18 Do I understand your testimony, then,
19 that you in all of the cases that you worked with Mr.
20 Gorbett where he did the fire investigation that
21 you've never been provided with his final report in
22 any other cases?

23 MR. LEVITES: Objection.

24 You can answer.

25 A No, I don't think that that's correct.

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1 I think there are other cases where I don't get
2 provided his report. That's on the status of the
3 case and things like that. So, I can't say in all
4 other cases no, I never got his report or I got his
5 report in the other one but not in this one. There
6 is no uniform answer to all of those.

7 Q Okay.

8 Do I understand that answer to mean
9 that in some cases you got Mr. Gorbett's report with
10 regard to his conclusions as to the cause and the
11 origin of the fire?

12 A Are you talking about when the case
13 goes to trial or right after the fire?

14 You have to give me some context. In
15 other words, I am -- I am not sure I can answer the
16 question correctly.

17 Q Let's just say at any time in the
18 course of your involvement in the case have you
19 received copies of Mr. Gorbett's report on the cause
20 and origin of the fire?

21 A I don't remember. I think the answer
22 is at some point I probably did. What I get early on
23 after a fire scene exam is frequently sketches of the
24 rooms or room of origin or something like that.

25 Q And you didn't get them from Mr.

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1 Gorbett in this case?

2 A I just don't remember. I may have
3 gotten this. I just don't remember as I am sitting
4 here right now.

5 Q Well, you didn't list them at all in
6 your report, correct?

7 A That's right. Although I have to say
8 sometimes they are embodied in his --

9 In other words, I get his photographs.
10 I think the photographs I got are just photographs.
11 Sometimes when I get information from him after a
12 scene exam, there are photographs and then there is
13 things that look like photographs but when you open
14 them actually it's a sketch he made as opposed to a
15 photograph from a camera. And the sketch may have
16 things, like, an area where they think is the area of
17 origin. It may have things like what the electrical
18 circuits were. And so, sometimes that's collected
19 and I get it all at once together with his
20 photographs. I think in this case I have
21 photographs, but I am not sure I have anything else.

22 Q How many photographs approximately did
23 you get from Mr. Gorbett?

24 A I don't think I remember --
25 I don't remember the exact number. I

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1 would say it's probably like 250; something like
2 that.

3 Q Okay.

4 Who provided those?

5 Mr. Gorbett directly or did you get
6 them from the attorney for HP?

7 A I don't remember.

8 MR. LEVITES: Can we take a break?

9 MR. SCHWARZ: Sure.

10 VIDEOGRAPHER: The time is
11 approximately 11:01.

12 Going off the video record.

13 (Whereupon, a short break was taken)

14 VIDEOGRAPHER: The time is 11:15.

15 We are back on the video record.

16 MR. SCHWARZ: Thank you.

17 Q We were looking at your report, which I
18 marked as Galler Exhibit 1.

19 And there is an item listed, number 8,
20 of documents you reviewed.

21 It says:

22 "Additional documents sent by e-mail on
23 February 21, 2024."

24 Can you tell me what documents you are
25 referring to there?

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1 A There were production documents of some
2 sort, but I don't remember exactly what they were.

3 Q Okay.

4 Can you put them on the list then of
5 other things you are going to --

6 A Sure.

7 Q -- provide to me?

8 A Sure.

9 MR. LEVITES: Taken under advisement.

10 We will take all that under advisement
11 after the deposition.

12 MR. SCHWARZ: Okay.

13 Q I wanted to ask you this, but when you
14 went to FRT to be part of that examination, did Mr.
15 Gorbett go to that examination as well?

16 A No, he didn't. He normally doesn't go
17 to lab exams.

18 Q Okay.

19 So, he is the one that typically
20 investigates the fire scenes for HP?

21 A He is one of the principal
22 investigators common on fire scenes. But there are
23 other people as well.

24 Q So, other people that join him or other
25 people that play that role for HP?

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1 A Other people. I am sorry. Other
2 people that play that role.

3 Q And in any of the other cases that you
4 have been involved with, with Mr. Gorbett doing the
5 fire scene investigation, have you ever experienced
6 him not producing a report and testifying in the
7 case?

8 A Sure.

9 Q So, it's a common occurrence that HP
10 hires a fire investigator who doesn't produce a fire
11 investigation report?

12 MR. LEVITES: Objection.

13 You can answer.

14 A I am not quite sure that I said it was
15 common. But I think there are times that he's been
16 in a fire scene with me and then later on the case
17 progresses and I don't see a report from him.

18 Q Okay.

19 If we would turn to Section 2.0 on the
20 first page of your report, it says a, "Brief
21 Description of the Fire."

22 Do you see that?

23 It's the very first page of Exhibit 1.
24 Tab one.

25 A Yeah. Sure. First page. Okay. I got

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1 it.

2 Q Good.

3 A Sorry.

4 Q That's okay.

5 And is it a fair assumption that you
6 put together this brief description based upon the
7 other materials that you reviewed in this case?

8 A Yes.

9 Q One item that is not listed as a
10 document you reviewed but is referenced on the next
11 page is the Allegany Fire Service Investigation
12 Report.

13 A Yes. But I think that that's the
14 documents --

15 It's either included in the materials
16 that were provided to me. You know, the discovery
17 documents that were provided to me. So, that would
18 be on the first page.

19 So, I guess you are asking why isn't it
20 on the list?

21 Q No. I just wanted --

22 I was just noting that you reviewed
23 that as well.

24 A Yes, I did.

25 Q Okay.

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1 And in the Allegany Fire Service
2 Investigative Report, there is also some statement
3 that was taken by -- from Carol Marcellin, who was
4 the witness to the fire, that was taken the night of
5 the fire.

6 Do you recall that?

7 A I'm sorry.

8 Can you repeat the question?

9 Q Sure.

10 In the Allegany Fire Investigation
11 Report there is a statement that was taken from Carol
12 Marcellin on the night of the fire having her explain
13 what she saw and what she did.

14 Do you recall that?

15 A I am not sure. Which --

16 Are you referring to the first
17 paragraph under the Allegany Service discussion?

18 Q No. I am asking you.

19 In the actual report from the Allegany
20 Fire Service, do you recall reviewing that because
21 you quoted it here, right?

22 A Yes.

23 Q And in that -- not the part you
24 quoted -- but another part of the report there is a
25 statement that was taken from Carol Marcellin on the

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1 night of the fire.

2 A Well, I remember her report of what she
3 did in her deposition. And if it was also in the
4 Allegany Fire Service Report, I probably would have
5 said oh, I recognize that. So, you know, yes, it
6 could have been there, but it is not something that I
7 recall as I am sitting here right now.

8 Q Okay.

9 In any event what you summarized here
10 in 2.0 of your report on page one is your synopsis of
11 what you believed that the testimony or statements
12 from Carol Marcellin were?

13 A Yeah. At the second paragraph on page
14 1 on the bottom --

15 The paragraph on the bottom of page 1.
16 According to her testimony.

17 Is that what you are asking me about?

18 Q Well, you start out in the first
19 paragraph where you say that:

20 "Ms. Marcellin testified that she was
21 awakened by a smoke alarm around 4 a.m.
22 She silenced the alarm and could see a glow
23 from the room where the computer was
24 located. She got a fire extinguisher from
25 the kitchen and attempts to fight the fire.

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1 She was unable to fight the fire."

2 So, that's the first part where you
3 recite that and that would be from Carol Marcellin,
4 correct?

5 A Correct. Correct.

6 Q And you then go into further summary of
7 the death of Mr. Hollowell?

8 A Correct.

9 Q So, with regard to the first part
10 though did you find any evidence inconsistent with
11 her statements in that first paragraph of your
12 section 2.0?

13 MR. LEVITES: That's from Ms. Marcellin
14 testifying that she was unable to fight the
15 fire?

16 Q Being awakened by the smoke alarm and
17 seeing the glow from the room where the computer was
18 trying to put it out and being unable to.

19 Did you find any evidence in the case
20 that was inconsistent with her account?

21 A I don't think so, but I am not really
22 quite sure what --

23 You mean did I find anything
24 inconsistent with that description in the first
25 paragraph? No.

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1 Q Okay.

2 Thank you.

3 Now, if you turn to tab 19, which I
4 marked as Exhibit 2. That is the Allegany Fire
5 Report.

6 A Tab 19.

7 Q Yeah.

8 The first page says Exhibit A, but
9 that's just the way it was copied.

10 A Okay. I am just trying to get my elbow
11 positioned to the right place here. Exhibit A.

12 Q Just turn to the next page. That's
13 where we will start.

14 A Okay.

15 Q That, again, has been marked as Exhibit
16 2.

17 And this is a report that you
18 previously reviewed, correct?

19 A Correct.

20 Q It appears that this report was based
21 on the investigation that was conducted by the
22 Allegany County Fire Service Fire Investigation Team
23 on the night of the fire; the early morning hours of
24 January 24th, 2020.

25 A I think that's correct.

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1 Q And this report indicates that they
2 actually had four fire investigators that were called
3 to the scene and reviewed all of the evidence in the
4 house on the evening of the fire or the early morning
5 hours of the fire?

6 A I don't see where it says four, but I
7 think I recall that -- that -- four investigators. I
8 think I recall reading that in the document
9 somewhere.

10 Q Well, if you look at the narrative on
11 the second page or the page after the first page, it
12 says "Narrative."

13 A Yes.

14 Q And it lists fire investigators and it
15 lists Edwards, Aderhold, Valeri and Luckey.

16 A Yeah, I see it.

17 Q Okay.

18 A Right.

19 Q If you turn to the second page, it
20 says:

21 "Upon looking more closely at an HP
22 laptop computer located on a pull-out shelf
23 of a computer cabinet the FI team saw
24 unusual looking damage to the area between
25 the keyboard and the screen."

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1 Did I read that correctly?

2 A Yes.

3 Q So, the Allegany fire investigators
4 found what they believed to be unusual damage on the
5 keyboard surface area of the laptop?

6 A Yes.

7 Q And then, they say:

8 "We picked up the HP laptop and
9 observed additional damage to the paper
10 under the battery cover area. We also
11 observed damage to the battery cover and
12 the battery located in the laptop."

13 A I see it, yes.

14 Q So, they looked at the bottom of the
15 laptop and saw that there was damage to the battery
16 compartment, correct?

17 A Yes.

18 Q And then they say:

19 "This area of the battery cover showed
20 an inconsistency with damage from a fire
21 spread. It should have been a protected
22 area."

23 Did I read that correctly?

24 A You did. You are doing very well.

25 Q Thank you.

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1 I am a pretty good reader, but not
2 always perfect.

3 Now, are you familiar with what a
4 protected area refers to in fire investigations?

5 A Yes.

6 Q And that means that it's an area that
7 wouldn't be expected to see the same extent of damage
8 as an unprotected area, correct?

9 A Correct.

10 Q So, they made an observation that an
11 area that should have been protected showed damage
12 which would be inconsistent with fire spread,
13 correct?

14 A Correct.

15 Q And that means that they came to a
16 conclusion that --

17 A No. I think you are starting to use
18 the wrong words. They didn't come to a conclusion.

19 Q Okay.

20 A They came to a hypothesis. There are
21 many possible conclusions in the fire investigation
22 world.

23 Q Right.

24 What did Mr. Gorbett come to with
25 regard to that finding?

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1 MR. LEVITES: Objection.

2 You can answer.

3 A I am not aware because I didn't discuss
4 it with him and I didn't get a report from him.

5 Q Okay.

6 So, for some reason Mr. Gorbett's
7 conclusions on that point were not available to you
8 or anyone else?

9 MR. LEVITES: Objection.

10 You can answer.

11 A I can't say for anyone else. I can
12 only answer for myself.

13 Q Okay.

14 You can answer for me too, because I
15 didn't see them either.

16 But you haven't seen them?

17 A I haven't seen anything written from
18 him. I haven't seen a report from him.

19 Q Okay.

20 Now, the next paragraph says:

21 "Based upon our observation and ruling
22 out all other probable causes it is our
23 hypothesis the cause of the fire is the HP
24 laptop."

25 Did I read that correctly?

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1 A Yes.

2 Q So, that is their hypothesis as to the
3 cause of the fire?

4 A I already answered that.

5 Q Okay.

6 A Correct.

7 Q And they also say that they ruled out
8 other probable causes, correct?

9 A Yes.

10 Q Now, did you perform any kind of an
11 analysis to consider and rule out other probable
12 causes beyond the laptop?

13 A I don't know of any other causes.

14 Q What other causes --

15 What other probable causes did you
16 consider other than the laptop battery pack?

17 MR. LEVITES: Objection.

18 You can answer.

19 A Well, let me answer the question this
20 way. You are looking at the fire department's report
21 and I have reviewed fire department reports on fire
22 causes and frequently found that they are
23 overstepping their experience in looking at fires
24 when regarding electrical equipment.

25 They will say oh, it must be this

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1 printer; it must be this power tool; it must be
2 anything. They say that and then eventually you find
3 out they are wrong. Because they are not trained
4 electrical engineers. They look at electrical things
5 and they think they know what the problem is.

6 Q You are speaking in generalities,
7 correct?

8 You don't know anything about these
9 investigators, correct?

10 A I am speaking in generalities. That is
11 correct.

12 Q My question was --

13 A But according to the NFPA a hypothesis
14 doesn't necessarily mean that they had come to a
15 conclusion.

16 Q Right. You made that point.

17 Let me go back to my question then.

18 What other probable causes did you
19 consider in your analysis of this fire other than the
20 HP laptop battery pack?

21 MR. LEVITES: Objection.

22 You already asked him.

23 MR. SCHWARZ: He didn't answer it. So,
24 I can ask him as many as times as I need to
25 get an answer. He told --

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1 MR. LEVITES: He said -- fire
2 investigation and he said no and now you
3 are asking him --

4 MR. SCHWARZ: I am asking him --
5 His report talks about other possible
6 causes. I want to know what he considered.

7 A I didn't look at other possible causes.
8 I was not at the scene. I reviewed everybody else's
9 report about what they had looked at.

10 Q Well, when you say --

11 A I am not a fire investigator, you know.
12 My job was to look at the computer and how things
13 around the computer reacted to the heat as a
14 possibility that that caused thermal runaway of the
15 battery. That's what I was looking at.

16 Q All right.

17 So, when you say you look at everybody
18 else's analysis of the fire scene, you are talking
19 about the Allegany fire investigators, correct?

20 A You also had a fire investigator
21 report, which I reviewed.

22 Q So, you looked at a fire --
23 You looked at the Allegany Fire
24 Investigative Report and you looked at the FRT fire
25 investigator's report and you didn't see anything

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1 from the HP fire investigator, right?

2 A Well, as far as I know, there was a
3 report written by Tim Meyers of Exponent, who is
4 working on behalf of HP and he is a fire
5 investigator.

6 Q Right.

7 But he wasn't at the scene.

8 A No.

9 But he had the benefit of Greg
10 Gorbett's pictures.

11 Q So, the only reports you saw from
12 people that were at the scene were from the Allegany
13 fire investigators and from FRT?

14 A I think that's probably correct.

15 Q And the hypothesis that both of these
16 investigative reports found was that the cause of the
17 fire was the HP battery pack?

18 A Again, it's a hypothesis.

19 Q Right. That's what they found. That's
20 their hypothesis.

21 A Yes, that's their hypothesis.

22 Q And they ruled out all other probable
23 causes?

24 A Well, one thing they didn't do is there
25 was a tripped circuit breaker and they didn't seem to

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1 have investigated what the tripped circuit breaker
2 was connected to.

3 Q What did Mr. Gorbett tell you about
4 that?

5 A There is also another --
6 He didn't tell me anything about that.

7 Q Okay.

8 A There is also another issue that has
9 not been resolved which is the electrical panel in
10 which the tripped breaker was found and the
11 un-tripped breaker was found --

12 Three. Three. Breaker number three
13 which supplied the outlet into which the computer was
14 plugged was not tripped, but breaker number four was
15 tripped. They didn't --

16 Nobody traced to what number four went
17 to. That's one issue. And the other issue --

18 Because it's here, we confirmed there
19 was a breaker, but it doesn't say what. Labelled as
20 LR, living room. But they never actually traced it
21 to see where it actually went.

22 And the other thing is the breaker
23 panel they were looking at is a Federal Pacific
24 Electric Stab Lok breaker panel, which those are
25 recalled and are unlisted by Underwriter Laboratory.

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1 And that means, as a result of that unlisting, which
2 happened in, like, 1990 or something like that, most
3 local jurisdictions won't allow those.

4 Q Mr. Galler, I am sorry, is there
5 anything in your report about this recalled service
6 box that you are talking about now?

7 A No.

8 Q So, is it true that the information
9 that you are supposed to testify about is limited to
10 what is in your report?

11 A I suppose, but --

12 Q Okay.

13 So, if you felt that the service box
14 was an important factor to your opinions, you would
15 have put it in your report, correct?

16 A Yes, that's generally correct. Yeah.

17 Q So, we don't need to talk about that.

18 A Okay. Okay. That's fine.

19 Q Now, if you can go back to your report?
20 And that's Exhibit 1, tab one, and turn
21 to page 2.

22 On page 2 you quote the section that I
23 read into the record from the Allegany Fire Service
24 Report of their hypothesis and ruling out other
25 causes other than the laptop, correct?

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1 A Yes, that's correct.

2 Q Then underneath that quote you say:
3 "It is unclear as to what additional
4 efforts AFS undertook to determine the
5 cause of the fire beyond stating a
6 hypothesis. Nothing in the AFS material
7 indicates that they considered the effects
8 of ambient heat exposure on the battery
9 cells."

10 A Yes.

11 Q Now, we just read the section where
12 they talked about the protected area, correct?

13 A Yes.

14 Q And the protected area discussion that
15 was in the AFS report addresses that because the
16 laptop was on a flat service, that the area
17 underneath the laptop would not expect to see the
18 kind of thermal damage that was found on the bottom
19 of the laptop.

20 Do you recall that?

21 A Yes.

22 Q Now, would you --

23 Are you saying that that is not an
24 observation that shows that they considered the
25 effects of ambient heat on the battery cells?

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1 A If you look --

2 Yes, I am saying that.

3 And if you look at this picture, that
4 is figure 1 of my report, what you will see is that
5 there is melted plastic dripping down the front
6 screen of the laptop. They did nothing to think
7 about or talk about what temperature would be
8 required to make that plastic melt.

9 Q What temperature would it require to
10 make that plastic melt?

11 A That plastic is made out of -- or the
12 plastics are an ABS plastic. It's a long word.
13 Acrylonitrile Butadiene Styrene. ABS. And a
14 Polycarbonate. PC. And the melting point of those
15 plastics is in excess of 200 degrees C.

16 So, to say oh, it wasn't from ambient
17 heat is a little bit unusual since we know the top
18 part of the laptop got to at least 200C because
19 that's why the plastic melted down.

20 So, given that and given the keyboard
21 keys are melted, how do they rule out ambient heat
22 exposure?

23 Q Okay.

24 What is the typical temperature
25 generated by a lithium-ion battery cell that goes

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1 into thermal runaway?

2 A Well, I think I read somewhere it can
3 get up to 500C if it gets into thermal runaway.

4 Q Actually, it could go up to 1,000C if
5 they go into thermal runaway, right, Mr. Galler?

6 A I think I've seen that number
7 somewhere.

8 Q Okay.

9 So, is it your testimony that somehow
10 looking at this picture you can determine that the
11 damage to the screen and the keyboard was not from
12 heat generated by thermal runaway?

13 A Well, yeah, because batteries are at
14 the bottom and the laptop screen that is melted is at
15 the top.

16 Q Are you --

17 A So, how did the heat get from under the
18 laptop to up to the top of the screen?

19 Q Mr. Galler, are you aware of the damage
20 that was to the battery compartment that goes right
21 through the top of the laptop?

22 A I am.

23 Q So, you are saying that the venting of
24 the hot gases and the ejection of the battery
25 materials out of the top of the laptop could not

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1 cause heat to the screen?

2 Is that your testimony?

3 A I am not saying it couldn't cause heat
4 to the screen. But if it caused enough heat to make
5 the top go to 200C, then why isn't the screen here at
6 the bottom where that hole is produced at the top of
7 the keyboard, that you are talking about, is damaged
8 in some way? Because if you make that glass go to
9 500 degrees or 1,000 degrees C, it's going to break.
10 It didn't break.

11 Q So, your --

12 I'm sorry.

13 Go ahead?

14 A The path of the heat from that hole to
15 the top. I don't see there being a good path from
16 the top of the keyboard to the top of the screen
17 without some damage taking place. And there is no
18 damage taking place.

19 Q Now, when you went to --

20 You actually could do better than
21 looking at photographs.

22 You actually had a chance to evaluate
23 the laptop, itself, right?

24 A What do you mean evaluate the laptop
25 itself?

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1 Q Well, the laptop was taken to FRT and
2 you went to FRT to evaluate the laptop and everything
3 else that was brought from the fire scene, right?

4 A Yes. That's correct.

5 Q And did you do a thorough analysis of
6 the screen and the area where the heat from the
7 battery pack melted the top of the laptop to make
8 some determination that the screen could not have
9 been damaged by thermal runaway?

10 A No, not at that time.

11 Q Did you take any notes of your
12 evaluation?

13 A Well, I think you are saying in looking
14 at my report now and doing work now did I take
15 advantage of what my observations are now two years
16 ago when I looked at the laptop. And the answer is
17 no.

18 Q So, you didn't take any notes of your
19 examination of the laptop itself that would show that
20 you were concerned that this could not have occurred
21 from thermal runaway?

22 MR. LEVITES: Objection.

23 You can answer.

24 A I think it was early in the evaluation
25 of the case. And I wasn't sure what. I was just

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1 looking at the pieces.

2 Q Well --

3 A I have pictures of the screen of the
4 laptop and it's undamaged between that hole that you
5 are pointing to on the computer near the keyboard and
6 up to the screen. So, there is no damage to that
7 area.

8 Q So, the one fact I want to get at is,
9 is you are saying that the plastic would have to get
10 to at least 200 degrees Celsius to melt like that,
11 correct?

12 A Correct.

13 Q Okay.

14 And that would be true generally of
15 that type of material?

16 A Correct.

17 Q And your hypothesis then --

18 Did you form a hypothesis?

19 MR. LEVITES: About what?

20 A I am not sure what you --

21 Q Withdraw that question.

22 Did you form a hypothesis as to what
23 caused the damage that you are pointing out on the
24 laptop?

25 A I now formulated a hypothesis.

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1 Q What do you mean now?

2 Like, today or?

3 A I mean, in the last several weeks when
4 I have been thinking about the fire and reading
5 everyone's reports, I then reconsidered the
6 possibility of thermal runaway from that.

7 Q Okay.

8 A Meaning, evidence of ambient heat
9 looking at those edges on the top of the laptop
10 screen.

11 Q Is this something that's in your report
12 or not in your report?

13 A It's not in my report.

14 Q So, you now have a new opinion that
15 wasn't in your report?

16 A I would say an additional opinion.

17 Q And the additional opinion is that
18 ambient heat in the room where the fire was caused
19 this damage to the laptop?

20 MR. LEVITES: Objection.

21 You can answer.

22 A Yeah.

23 Q What is the source of that ambient
24 heat?

25 A A hot layer of gas in the room.

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1 Q Okay.

2 A As the room is burning.

3 Q So, tell me about the thermal or the
4 hot layer of gas.

5 That's something that starts at the top
6 of the room and comes down as the fire progresses,
7 correct?

8 A That's correct.

9 Q So, that means that the heat layer
10 would have to have come down to the level of the
11 laptop in order to cause that kind of damage based on
12 your hypothesis?

13 MR. LEVITES: Objection.

14 You can answer.

15 A I don't think the heat has to be down
16 to the level of the laptop. I think the heat layer
17 is above that and it radiates infrared heat around
18 the room.

19 Q Okay.

20 A Down. You know, from the bottom of the
21 layer down.

22 Q So, you are saying that the temperature
23 of the heat layer radiating heat to the level of the
24 laptop was in excess of 200 degrees Celsius?

25 A Yes. Not the heat layer. Well, all I

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1 am saying is that the radiant heat was sufficient to
2 get the top edge of the laptop above 200 C.

3 Q Right.

4 And that would mean that everything in
5 the room above the level of the screen of the laptop
6 would have received the same heat or even a higher
7 heat, correct?

8 MR. LEVITES: Objection.

9 A Depends on its visibility to the hot
10 layer.

11 Q Well, all right.

12 Everything else in the picture above
13 the level of the laptop would have experienced an
14 even higher heat than that, correct?

15 MR. LEVITES: Objection.

16 You can answer.

17 A No. It depends. See the laptop screen
18 is visible to the large portion of a heat layer. So,
19 things like paper and stuff like that nearby were
20 actually back in a shelf and they may not have
21 been --

22 When I look at the pictures of the
23 armoire, it looks like there is a shelf above that
24 paper. So, it's not as exposed as the laptop is.
25 The visibility --

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1 There is different visibility to the
2 hot layer of different things.

3 Q So, you indicated that you didn't have
4 an expertise in fire analysis.

5 Tell me where you got the expertise to
6 make that statement that you just made.

7 In other words, where did that come
8 from?

9 A Well, I understand that the physics of
10 a hot layer of gas radiating downward on something.
11 And then, I looked at the pictures of the armoire and
12 what I see is shelves above that paper. So, probably
13 the reason --

14 The paper didn't --

15 Now, some of it did get brown, as you
16 see, just above into the right of the laptop. And
17 some of it got browned. And there is actually some
18 melted plastic stuff up there, too. And so, that --

19 But the monitor above the computer in
20 question isn't really melted there and that's because
21 it is actually set back a little bit so it's not as
22 visible. So, it's just geometry really.

23 Q Okay.

24 So, you are an expert then and you are
25 able to say the heat layer would not have penetrated

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1 the armoire?

2 MR. LEVITES: Objection.

3 You can answer.

4 A I didn't say I was a fire expert. I
5 said I was applying basic physics to the
6 understanding of how a hot layer radiates to where
7 the laptop was.

8 Q Right.

9 So, you've done research then into the
10 effect of a piece of furniture like this on the heat
11 layer and that somehow this furniture shelf would
12 protect certain items from the hot layer?

13 You've done research on that?

14 MR. LEVITES: Objection.

15 A I have not done research on that.

16 Q Okay.

17 A I am saying to you --

18 What I am saying to you is the simple
19 fact that there are batteries that went into thermal
20 runaway. Now, they could go into thermal runaway by
21 themselves without the effect of the room or they can
22 go into thermal runaway because the ambient heat was
23 high. And it seems like the fire department and
24 everybody else has ruled out the second aspect.

25 Q Okay.

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1 A What I am saying is there is evidence
2 of infrared radiation hitting the top of the laptop.
3 And it's high enough to cause acceleration in the
4 thermal runaway.

5 Q Okay. And we are going to get to that
6 in more detail.

7 Now, I would like you to turn to tab
8 five, which I marked as Exhibit 3.

9 And it's a photograph.

10 A Okay.

11 Q And do you recognize what that
12 photograph depicts?

13 A I think this is the bottom of the
14 incident subject computer.

15 Q Okay.

16 And it shows the --

17 Yes, that is correct.

18 And it shows the area of the battery
19 compartment in sort of the middle of the photograph,
20 correct?

21 A Correct.

22 Q And it shows --

23 Actually, one of the cells is visible
24 partially on the right side?

25 A It looks like one of the cells is

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1 visible on the left-hand side. But I think it
2 depends which way you are holding the picture.

3 Q I apologize.

4 A On the side that the hand is on.

5 Q Correct.

6 A Let's do that because I understand the
7 confusion there depending on how you have the
8 picture.

9 Q So, which side --

10 A I don't know how you got it oriented,
11 but you got it oriented that the hand is on the left
12 side; is that correct?

13 Q Yeah, the hand is on the left side.

14 Q Okay.

15 A So, let me orient it that way.

16 A So, if the hand is on the left side,
17 then would you agree with me that the damage to the
18 left side of the battery compartment is more severe
19 than the damage to the right side?

20 A MR. LEVITES: Objection.

21 A You can answer.

22 A Yes.

23 A Okay.

24 A Would you also agree with me that the

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1 area of the battery compartment sustained much more
2 thermal damage than any of the other part of the
3 bottom of the laptop?

4 A Yes.

5 Q Then if you can turn to tab 6, which is
6 the next one which I marked as Exhibit 4, that's a
7 photograph of the keyboard surface side of the
8 laptop, correct?

9 A Yes.

10 Q And that shows the damage that was
11 described by the Allegany fire investigation to the
12 top surface of the laptop in the area of the battery
13 compartment?

14 A Well, I see there is damage to the
15 laptop. It's in the area of the battery compartment.
16 But I don't remember what Allegany fire service said
17 exactly. So, probably it's consistent with what they
18 said, but I don't remember what they said.

19 Q You don't have to turn. I will just
20 read it.

21 From Exhibit 2, the Allegany Fire
22 Service Report, it says:

23 "The FI team saw unusual looking damage
24 to the area between the keyboard and the
25 screen."

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1 And that's what they are describing
2 that's shown in Exhibit 4, correct?

3 MR. LEVITES: By the way, Steve, which
4 page are we talking about in tab 19.

5 MR. SCHWARZ: That's page 2 of tab 19
6 that we read before.

7 MR. LEVITES: Page 2 of tab 19. Page 2
8 of the report or page 2 of the tab?

9 MR. SCHWARZ: I'm sorry. Page 2 of the
10 report. The cover page doesn't have a page
11 number.

12 MR. LEVITES: Okay.

13 MR. SCHWARZ: It's the last page.

14 MR. LEVITES: Okay. So, the last page.

15 Okay. I see where you are saying. So,
16 the sentence beginning "Upon looking more
17 closely"?

18 MR. SCHWARZ: Right.

19 Q So, I am sure you forgot what the
20 question was, Mr. Galler, so I am just going to
21 remind you.

22 The unusual looking damage that's
23 described by the Allegany fire service is basically
24 this hole in the top of the computer near the screen,
25 right?

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1 A I think that's correct, yes.

2 Q Okay.

3 And that damage shows that the battery
4 compartment was almost completely exposed to the
5 surface.

6 The plastic is all gone, right, that
7 covered it?

8 A I think it's melted. I wouldn't say
9 it's all gone; but, yes, you could see through to the
10 blue paper below.

11 Q And the damage to that compartment,
12 again, doesn't appear to be uniform. It's worse
13 closer to the edge of the computer and not as bad as
14 you get towards the center of the computer, correct?

15 A Correct.

16 Q So, the thermal damage to the battery
17 pack compartment was not uniform?

18 MR. LEVITES: Objection.

19 You can answer.

20 A Well, I guess as far as this picture
21 what it shows, that is correct.

22 Q Okay.

23 And you saw this --

24 A On the top surface.

25 Q You saw this live --

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1 Well, it's also shown on the bottom
2 surface, right?

3 We already talked about that.

4 One side is more damaged --

5 A It's not uniform. It's not uniform.

6 Correct.

7 Q Okay.

8 Now, in your report, which is Exhibit
9 1, you make the statement --

10 And I will find it.

11 If you turn to your conclusions page,
12 page 20 --

13 A Uh-huh. Yeah.

14 Q -- of Exhibit 1.

15 A Yes.

16 Q Conclusion 6 states:

17 "The thermal damage to the subject
18 computer and the area around the computer
19 is not consistent with a fire origin in the
20 computer."

21 A I see that.

22 Q Did I read that correctly?

23 A Yes.

24 Q I want you to tell me precisely what
25 evidence on the computer, itself, led you to that

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1 conclusion?

2 A If ignition -- if ignition took place
3 on the bottom of the computer, then I would have
4 expected the fire burning right there near the
5 computer or at the computer would have consumed all
6 the plastic that we have been discussing in these
7 pictures. In other words, the keyboard would be
8 burned. The battery compartment would be gone. We
9 would see char. We would see consumption of the
10 paper nearby as if a fire was evolving from that
11 spot. But that's not what we have. So, in my mind
12 this is inconsistent with the fire starting in the
13 computer.

14 Q Okay.

15 I want to find out what other than your
16 mind reaches that conclusion.

17 So, in other words are you saying that
18 based upon your experience in fire investigation that
19 you would expect to find different types of damage if
20 the fire originated in the computer?

21 MR. LEVITES: Objection.

22 You can answer.

23 A In my experience, and looking at
24 probably 100 fires where a product is involved, and
25 the product is made of plastic, that if we

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1 hypothesized the product starts a fire, normally most
2 of the plastic is consumed and then the fire spreads
3 outward. That's what a fire does. It spreads
4 outward.

5 So, I am saying -- so, I am saying that
6 is what my experience is. And so, I am having
7 trouble looking at these pictures and saying this is
8 where the fire started. It looks like the battery
9 got hot. I will give you that. But it doesn't look
10 like the fire started here and spread out.

11 Q Okay.

12 A I think is what the Allegany fire
13 service was, you know, if you are looking for a fire
14 origin. But the origin has to spread out from there
15 and get to the walls and the ceiling. And it doesn't
16 do that. I can't see how this does that.

17 Q Okay.

18 Now, have you actually witnessed
19 thermal runaway in a 18650 cell?

20 A I have run --

21 I have witnessed thermal runaway in a
22 lithium-ion battery, but it was not a 18650.

23 Q Okay.

24 Have you reviewed any videos of other
25 people experimenting with putting an 18650 cell into

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1 thermal runaway?

2 A I may have, but as I am sitting here
3 right now, I can't recall a specific video other than
4 early ones -- meaning, more than five years ago -- of
5 people putting 18650s and a laptop on a hot plate on
6 YouTube. So, I don't consider them scientific, but I
7 had seen those. But I haven't seen a laboratory test
8 where people, engineers said, "Here is what we are
9 going to do. We are going to have these go into
10 thermal runaway."

11 Q So, we will get into this, but are you
12 familiar with the venting of flammable gases from
13 18650 cells that go into thermal running?

14 A Yes.

15 Q Are you familiar with the explosion and
16 ejection of battery contents out of 18650 cells that
17 are in thermal runaway?

18 A Yes.

19 Q And you are saying that the explosion
20 of cells or the venting of hot gases that are
21 flammable would be inconsistent with what you are
22 seeing on this laptop?

23 MR. LEVITES: Objection.

24 You can answer.

25 A No, I didn't -- I didn't say that.

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1 And I see that remains of battery cells
2 were thrown as if an explosion took place. So, I am
3 not saying that they didn't go into thermal runaway.

4 Q But I think you are saying if they went
5 into thermal runaway, you would not expect to see
6 this pattern?

7 If they went into thermal runaway
8 because of defects in the batteries, you would not
9 expect to see this fire pattern?

10 MR. LEVITES: Objection.

11 You can answer.

12 A No, I don't think I said that.

13 I think what we were just discussing
14 is -- and maybe you asked intermediate questions and
15 I lost track. But what I think you are discussing is
16 the behavior of the fire propagating from this area
17 of the battery is consistent with the fire origin
18 being here. And what I am saying is I think there is
19 evidence of thermal runaway, but it doesn't look like
20 the things that I know to be flammable, like, the
21 keyboard and the plastic, they are not consumed. So,
22 how could the fire propagate from this area without
23 that consumption.

24 Q So, if the cells went into thermal
25 runaway because of defects in the cells, you are

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1 saying that you would expect the entire keyboard to
2 be melted?

3 MR. LEVITES: Objection.

4 You can answer.

5 A I am not --

6 I am going to say what I said again.
7 And then I am going to listen to your question more
8 carefully. I am sorry. What I am saying is there
9 may have been thermal runaway. There may have been
10 thermal runaway because of ambient heat or there may
11 have been thermal runaway because the batteries have
12 defects in them and they were overcharged. What I am
13 saying is that those are both possibilities.

14 What I am saying is that the fire
15 originating here and propagating out to the rest of
16 the room, which is what the Allegany Fire Service
17 hypothesized, it doesn't make any sense to me because
18 here are flammable things that are not burned. I
19 mean, there is the laptop. It's not on the desk
20 anymore in the picture we have been discussing. I am
21 just saying the keyboard and the plastic, they didn't
22 burn. So, how could fire consume things on the
23 armoire without consuming the laptop? The laptop is
24 largely intact. It is melted in a couple of areas
25 and consumed in a couple of areas, but it's largely

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1 there. If you look at the x-ray, everything in the
2 bottom of the laptop is still there.

3 Q So, you are offering this opinion,
4 then, based upon your training and experience as an
5 electrical engineer?

6 A As an electrical engineer who looks at
7 fire damaged electrical equipment. This has been
8 hypothesized as the cause of a fire. And I think
9 that the fire investigator said, "yeah, the fire
10 starts at this product," and the product looks
11 completely consumed, then that's what I expect.

12 When a fire investigator says, "this is
13 what I think started the fire" and two-thirds of this
14 thing is still there and not burned, it doesn't make
15 any sense. So, I say it doesn't make any sense.

16 Q Now, in the 20 or 30 other thermal
17 runaway laptop investigations you've done, how did
18 those laptops look different than this one?

19 MR. LEVITES: You are asking him each
20 one or just generally?

21 MR. SCHWARZ: Generally.

22 A It depends. Sometimes they go into
23 thermal runaway --

24 The batteries go into thermal runaway
25 and there is a relatively small fire and it's put

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1 out.

2 Q Okay.

3 A And then, it looks like --

4 Q Well, let me stop you there.

5 A Yeah, okay.

6 Q If there are batteries in a laptop that
7 go into thermal runaway and then the fire is put out,
8 tell me how the laptops in that scenario look
9 different than this laptop?

10 A I guess what I meant to say is not the
11 fire is put out, the fire goes out. I don't
12 necessarily know how it goes out.

13 Q Okay.

14 The fire went out.

15 A Okay. The fire went out. I can think
16 of one instance. I am not trying to think of a lot
17 of instances, but I can think of one instance. The
18 fire --

19 There was a fire that started in a
20 room, apartment room. Maybe the room was 10 by 20.
21 It had a kitchen counter. There was a large flat
22 screen television against one wall and on the kitchen
23 counter there was a laptop with it being charged with
24 18650s. And the television on the wall. A flat
25 screen television on the wall. And there is a fire

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1 there. I mean, we see burning from that looking at
2 the fire scene. We see burning there. A sprinkler
3 is activated. So, it puts the fire out. Then there
4 is a secondary fire 10 feet away on the kitchen
5 counter where there is a battery -- where 18650s in a
6 laptop were being charged. And there is a small fire
7 there. Like, it looks like it ignites part of the
8 battery pack, but doesn't propagate any further and
9 then goes out. And the battery pack was --

10 The way the battery was positioned, the
11 way the laptop was positioned, was such that the
12 battery compartment was actually hanging off the
13 counter a little bit so when the TV set caught fire,
14 hot air heated the room up and was able to impact the
15 battery compartment of the laptop and the batteries
16 went into thermal runaway. And then, it went out. I
17 guess it --

18 I am not sure why it went out, but it
19 went out.

20 Q Okay.

21 So, if --

22 That wasn't an answer to my question,
23 but you did give us a good description.

24 In that case, that would be a case of
25 thermal runaway that you believe was created by

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1 external heat?

2 A Correct.

3 Q And in that scenario, how did the
4 physical damage to the laptop compare to the physical
5 damage of this laptop?

6 MR. LEVITES: Objection.

7 You can answer.

8 A It was -- it was similar in that the
9 whole laptop, that I was describing, the whole laptop
10 wasn't consumed. So, there was still a keyboard
11 there. And I think the -- I am not sure where the --

12 I don't remember exactly where the
13 battery pack was. It might have been in a similar
14 arrangement like this. In other words, the battery
15 pack was in the rear behind the keyboard at the
16 bottom and part of it was hanging over the kitchen
17 counter facing the fire from the television set. And
18 I think about half or a quarter of the laptop was
19 burned.

20 Q Okay.

21 A It was similar to this in that the
22 entire area on the kitchen counter wasn't burned.
23 Like the kitchen counter wasn't burned much. It was
24 mostly the laptop and maybe just a fraction of the
25 laptop was burned.

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1 Q And this was an HP laptop that you were
2 investigating on behalf of HP?

3 A I don't remember. I know I was there
4 on behalf of HP so I have to presume it was an HP
5 laptop.

6 Q Is that the only example in your career
7 that you've seen thermal runaway in a laptop or are
8 there others?

9 MR. LEVITES: Objection.

10 You can answer.

11 A There are some that have been described
12 to me. I may have seen a few more. But there is one
13 that comes to mind which is not that I physically
14 saw, but it was a case where a fire investigator that
15 I work with --

16 Not Greg Gorbett. Not somebody who was
17 working before. I was doing work with HP. He called
18 me up and said, "I have this odd fire and I have what
19 looked like two fires in the same room and I don't
20 understand how it worked."

21 And I described this concept to him, of
22 looking at 18650s going into thermal runaway and
23 ejecting their hot contents across the room into a
24 wastepaper basket. And he said "Oh, now I see how it
25 works." He was seeing two fires in two different

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1 places, but he wasn't sure how they communicated.

2 Q Okay.

3 And that --

4 A That was a case of thermal runaway. I
5 am not sure what caused the thermal runaway, but I am
6 just saying the battery ejected hot contents.

7 Q Right.

8 But my question is did you actually
9 observe that laptop to see what damage the ejection
10 of the battery contents made to the actual laptop?

11 A No, I don't think I ever saw that one.

12 Q So, you've never seen what thermal
13 runaway that originates in a battery pack does to a
14 laptop?

15 MR. LEVITES: Objection.

16 You can answer.

17 A As I am sitting here, I can't recall
18 the cases or the number but it just seems to me that
19 I've seen this before that it's thermal runaway.

20 Q So, you think you've seen thermal
21 runaway in a laptop before.

22 And what I am asking you is in the
23 times that you've seen thermal runaway that
24 originated in a laptop, I want you to tell me what
25 the damage to the laptop, itself, the plastic was and

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1 how it compared to this laptop?

2 MR. LEVITES: Other than the two cases

3 --

4 MR. SCHWARZ: Other than what?

5 MR. LEVITES: Other than the two he
6 just talked about?

7 MR. SCHWARZ: Well, the one he just
8 talked about he didn't say he looked at the
9 laptop. He just talked to the guy on the
10 phone. And the other one he said he
11 believed was caused by the TV fire.

12 So, I want to know if he's got
13 experience looking at laptops after thermal
14 runaway occurs that originated in the
15 battery pack and not from an external
16 thermal heating.

17 Q Do you understand my question, Mr.
18 Galler?

19 A I think I do. I am just trying to
20 recall. I can't tell you which case it was, but
21 there was another laptop that I saw where I was
22 obviously --

23 I was called by HP. I went to some
24 place in Ohio. Saw a laptop in somebody's lab. And
25 the laptop was partially burned like this one. In

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1 other words, it was partially consumed, but not
2 completely consumed. And I don't know whether --

3 What happened with the rest of the
4 fire. I just really saw the laptop on a workbench.

5 But when I looked at the battery
6 compartment and the Battery Management Unit, I can
7 tell that it didn't have the necessary safety
8 features similar to the BMU in the case we are
9 discussing now.

10 Q And this was somewhere, like, ten years
11 ago?

12 A Probably. Maybe more like eight.

13 Q So --

14 A I can't remember.

15 Q So, in that laptop then where you
16 determined that thermal runaway was likely caused
17 inside the battery pack because of the lack of safety
18 devices, you are saying the laptop in that case was
19 not completely consumed by fire?

20 MR. LEVITES: Objection.

21 A I think that's correct. Yes.

22 Q And that's similar to this one?

23 A Correct.

24 Q Okay.

25 Let's go to tab number 2.

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1 MR. LEVITES: Let's take a break.

2 MR. SCHWARZ: Yeah, let's take a break.

3 VIDEOGRAPHER: The time is 12:17.

4 We are going off the video record.

5 (Whereupon, a short break was taken)

6 VIDEOGRAPHER: The time is 12:26. We
7 are back on the video record.

8 Q Mr. Galler, just before we took the
9 break, I asked you to turn to tab 2 that we've marked
10 as Exhibit 5 for your deposition.

11 And this is Dr. Martin's report.

12 And you are familiar with that,
13 correct?

14 A Yes.

15 Q If you turn to page 10 of his report,
16 there is a Section C that is entitled, "Failure
17 Modes."

18 A Sorry. Took me a while. There are a
19 lot of pages to flip through here.

20 Okay. Page 10. Failure modes.

21 Q You are with me?

22 A Yes.

23 Q So, Dr. Martin on page 10 describes
24 that:

25 "Lithium-ion batteries can fail in both

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1 non-energetic and energetic modes."

2 Do you agree with that?

3 A I think so, yeah.

4 Q So, I just want to talk a little bit
5 about non-energetic failures of lithium-ion
6 batteries.

7 Can a non-energetic failure of a
8 lithium-ion battery go into thermal runaway?

9 A Non-energetic.

10 Well, I am not familiar with that
11 combination. I visualize a non-energetic failure
12 something that doesn't generate energy. And so, when
13 you say thermal runaway, the battery is getting hot.
14 When you say non-energetic, there is no energy. Why
15 would the battery get hot if it is not energetic?
16 So, I don't understand that question.

17 Q Okay.

18 So, I think that's what I was getting
19 at.

20 In other words, non-energetic failures
21 do not result in thermal runaway, correct?

22 A I think that's correct, yes.

23 Q So, lithium-ion batteries, if left
24 uncharged for a period of time, they lose energy,
25 correct?

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1 A They do, but they have a bad habit of
2 retaining energy for a long time. So, say, long or
3 time or something, got to be careful. I've seen
4 18650s retain their charge for two years.

5 Q What about ten years?

6 A I don't know. I just don't know. So,
7 I am just saying they have a capacity for retaining
8 energy for unexpectedly long periods of time. I
9 never measured it. All I know is I had one which I
10 expected to be de-energized after storage for a
11 couple of years and still had most of its charge.

12 (Whereupon, a discussion was held off
13 the record)

14 Q In any of the thermal runaway
15 investigations that you've done for laptop computers
16 or any other type of lithium-ion battery, have you
17 ever seen thermal runaway occur in a battery pack
18 that's not hooked up to a charger?

19 A I am not sure and I don't remember.
20 Meaning, I don't remember. I mean, that I might
21 have --

22 I may have seen one that was alleged to
23 go thermal runaway that wasn't hooked up to a
24 charger.

25 Q Okay.

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1 In the scenario where a thermal runaway
2 occurs when it's not hooked up to a charger so that
3 it's not receiving power from an AC power source,
4 what would the modes of causing that thermal runaway
5 be?

6 A Well, if it's exposed to external
7 ambient heat they will go into thermal runaway even
8 if they are not on a charger.

9 Q Okay.

10 That's one.

11 A That's one.

12 And I have -- I am not sure I've
13 seen -- I am not sure I've seen many of those --
14 there is another -- there is a couple of different
15 modes. And I only -- I think I just read about them
16 in somebody's -- either in somebody's report or some
17 relevant material I was just reviewing where they
18 said well, there could be a --

19 There is a separator between the plus
20 and the minus foils, essentially in the battery. If
21 the separator failed, then the battery can generate,
22 like, a short circuit is generating heat by itself.
23 And that self-heating will cause thermal runaway of
24 the battery. Or there could be a small piece of
25 debris in the battery that eventually gets to a point

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1 where it shorts the plus and minus and you get what
2 is like thermal runaway. Maybe it's called thermal
3 runaway. I don't remember. But that was a failure
4 that occurred also and it could be pretty energetic.

5 Q Now, is it true that the amount of
6 energy created when that happens would be
7 proportional to the amount of energy that was stored
8 in the battery at the time?

9 A Well, it would be limited. You can't
10 get more energy where there's not enough.

11 Q So, if lithium-ion batteries are
12 essentially dead or uncharged, that would make it
13 highly unlikely for a lithium-ion battery to go into
14 thermal runaway that's not hooked up to an AC power
15 source, correct?

16 A I think that's correct.

17 Q And if lithium-ion batteries are
18 allowed to sit uncharged for ten years, you would
19 agree that they likely would have lost all of their
20 charge by that point?

21 MR. LEVITES: Objection.

22 You can answer.

23 A Yeah, I don't want to put a time limit
24 on it. It is not something I had experience with. I
25 had experience with it for a couple of years, but not

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1 something I read about or, you know, can give a
2 reasonable answer to.

3 Q Based upon your knowledge of batteries
4 and physics, the more time that goes by that they are
5 uncharged, the less charge they are going to have,
6 correct?

7 A Correct.

8 Q And you can't say whether they would be
9 totally dead after ten years, but you can say they
10 would be significantly less charged than they were
11 the last time they were charged?

12 MR. LEVITES: Objection.

13 You can answer.

14 A I just don't want to categorize it that
15 way. It's not something I read about or measured or
16 tested myself so I can't tell you even ten years --

17 I wouldn't be surprised if ten years
18 later the battery still had charge in it. I am not
19 --

20 I would be a little bit surprised, but
21 I wouldn't want to say they are mostly dead after ten
22 years.

23 Q Okay.

24 But you would agree with me that after
25 ten years they are going to be significantly less

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1 charged than they were when they were last charged?

2 A Right. I think I can agree with that.

3 Q Okay.

4 Good.

5 Now, let's turn, if we could, to tab
6 24, and that I marked as Exhibit 6.

7 And this is an article that you cited
8 in one of your references. It's the Yuan article.

9 A Wait.

10 Tab 24?

11 Q Tab 24.

12 A Hang on. It's a big notebook.

13 Okay.

14 Something specific you want to call my
15 attention to?

16 Q Yeah.

17 Once we find it, we will go from there.

18 Do you have the first page?

19 A Yeah, I have the first page.

20 Q Do you recall that this was an article
21 that you cited in your report?

22 A No, I don't.

23 Q Okay.

24 A I cited this one?

25 Q I actually --

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1 Maybe I am wrong about that. Maybe it
2 was one of the other experts. So, I apologize if I
3 am wrong.

4 A It doesn't look familiar to me.

5 Q Okay.

6 On the break, I will see if I can find
7 it.

8 There is an introduction section to
9 this article.

10 A Do you see that?

11 A Yes.

12 Q And about midway through that first
13 paragraph, the first column, it says:

14 "The Occupational Safety and Health
15 Administration OSHA 2019 reports that the
16 US Consumer Product Safety Commission
17 identified over 25,000 overheating or fire
18 incidents involving more than 400 types of
19 lithium-ion powered consumer products over
20 a five-year period."

21 A I see that.

22 Q My question is did you have a general
23 understanding that there have been a number of fire
24 incidents involving lithium-ion batteries that have
25 been reported to the government?

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1 MR. LEVITES: Objection.

2 You can answer.

3 A I was --

4 Until you called my attention to that
5 statement starting with the Occupational Safety and
6 Health Administration, I was not aware of the
7 numbers.

8 So, could you please repeat your
9 question now that I --

10 Q Well, my question is --

11 I will ask you a different question.

12 Does that surprise you?

13 MR. LEVITES: Objection.

14 You can answer.

15 A Yeah.

16 Q It does surprise you?

17 A Yeah. I didn't know it was quite that
18 many reports; 25,000. Even over a five-year period.
19 I didn't know it was that many.

20 Q And you've seen yourself, you said, 20
21 or 30 of them, right, or more?

22 A Correct.

23 Q Then a couple of sentences --

24 Another sentence later it says:

25 "The major cause for catastrophic

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1 failure of lithium-ion batteries is thermal
2 runaway that occurs when heat generated
3 from exothermic reactions inside a battery
4 outpaces heat dissipated from the battery
5 leading to a rapid increase in temperature
6 and pressure that further increases the
7 reaction rate."

8 Do you agree with that?

9 A I see that. Basically there is two
10 parts to it. One is there is an unintended reaction
11 in the battery. And that, you know --

12 Every object cools from its
13 surrounding. The air cools the object. So, I guess
14 what they are saying the internal mechanism causing
15 the heat produces more heat than the object can be
16 chilled by the air. And so, it generates more heat
17 than is being removed by the air and so it gets hot.

18 Q Right.

19 And this is the major cause of
20 catastrophic lithium-ion battery failures according
21 to this article.

22 And my question is do you agree to
23 that?

24 MR. LEVITES: Objection.

25 You can answer.

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1 A Can you please repeat the question?

2 Q Yeah.

3 I am just asking if you agree with the
4 statement that I just read from this article about
5 the major cause of catastrophic failure of
6 lithium-ion batteries.

7 A Yeah.

8 MR. LEVITES: That begins with "the
9 major cause" and then it continues to the
10 words "the reaction rate" on the following
11 column. The question is do you agree with
12 that statement.

13 THE WITNESS: I agree with his
14 statement.

15 The only problem --

16 The problem I am having is that it
17 doesn't say what the cause of the thermal
18 runaway is. Thermal runaway. Okay? So,
19 that's the process of it's getting hotter
20 and continues to increase in getting
21 hotter.

22 And then, it says:

23 "The self-accelerating process will
24 lead to cell rupture and the venting of
25 toxic and highly flammable gases, and the

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1 release of heat --"

2 Q Wait. You can't read that fast. The
3 court reporter will have cramps in her hands.

4 A I'm sorry.

5 Q So, let's just stick with the first
6 sentence that I asked you about and it talks about an
7 exothermic reaction inside the battery that causes
8 heat that is not dissipated. That's the question.

9 Is that something you agree with or
10 disagree with?

11 MR. LEVITES: He has -- the whole
12 sentence. He needs to be able to look at
13 the whole sentence.

14 MR. SCHWARZ: Well, I'm not telling him
15 not to. But I am trying to focus him on
16 the question --

17 A You started -- the sentence --

18 The part you are interested in starts
19 with "the major cause for catastrophic failure"?

20 Q Right.

21 A Okay.

22 And I guess could you please --

23 Q Let me break it down.

24 What does an exothermic reaction inside
25 the battery mean to you?

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1 A It means it's a reaction that is
2 causing heat.

3 Q Okay.

4 So, does a reaction inside the battery
5 that generates heat and it generates more heat than
6 the battery can dissipate, correct?

7 A Correct. Correct.

8 Q And as a result of that, the battery
9 cell can go into thermal runaway due to that
10 exothermic reaction inside the battery?

11 A Correct.

12 Q And according to this article, that's
13 the major cause of catastrophic failure of
14 lithium-ion batteries?

15 A Correct.

16 Q Okay.

17 A The part that I am having difficulty
18 with is when it starts it says "the major cause for
19 when heat generated from an exothermic reaction," it
20 is unclear what initiates the exothermic reaction.
21 And I was discussing a few minutes ago, well, there
22 could be a particle in the battery due to the
23 manufacturing that causes a short and then there is
24 an exothermic reaction. The battery starts to get
25 hot. And then, the rest of the plus and minus foils

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1 get connected and more heat is generated. And so,
2 that runaway process is consistent with this
3 statement except that it's caused by a specific
4 failure, a particle of something in the cell,
5 metallic stuff in the cell that's not supposed to be
6 there, or the separator between the plus and minus
7 doesn't --

8 There is a hole in it and there's plus
9 and minus foils. So, that root cause of the failure
10 in the exothermic reaction is not spelled out in the
11 stuff that you are reading where it states "the major
12 cause."

13 Q Right.

14 Let me just ask you a different
15 question.

16 With regard to what this statement
17 says, whatever the mode was of the number of modes
18 that you have depicted, they all were inside the
19 battery, right?

20 A Correct.

21 Q So, the way I interpret this, and you
22 may interpret it differently, is that the major cause
23 of catastrophic failures are these exothermic
24 reactions that are somehow generated inside the
25 battery?

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1 MR. LEVITES: Is that a question,
2 Steve?

3 MR. SCHWARZ: I am asking if he agrees
4 with that.

5 A Yeah, an exothermic reaction inside the
6 battery.

7 Q And that's the typical or major cause
8 of the catastrophic failure of the 25,000 incidents
9 that they are reporting here?

10 MR. LEVITES: Objection.

11 You can answer.

12 A Yeah, I agree with the statement.

13 Q Okay.

14 Then let's move on to the next
15 statement.

16 A But what I am saying is the initial
17 causes -- there can be many initial --

18 Not many. But several initial causes
19 of something that people would consider an exothermic
20 reaction inside the battery.

21 Q Right.

22 If this doesn't say --

23 A -- external to the battery, too.

24 Q Okay.

25 But that doesn't say that here, does

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1 it?

2 A It doesn't say anything there. That's
3 my objection to this statement in agreeing to the
4 statement.

5 Q So --

6 A Whether there are failures, something
7 outside the battery causing thermal runaway or
8 something inside the battery causing the thermal
9 runaway.

10 But in my mind, it just said there is
11 an exothermic reaction and what I am saying is that
12 paragraph by itself or that subparagraph itself
13 doesn't say because of contaminants, because of
14 external heating, because somebody stepped on the
15 battery. So, all that kind of stuff can make an
16 exothermic reaction inside the battery. So, what I
17 am saying is by itself, taken out of context, that
18 doesn't say what the initial root cause of the
19 problem is.

20 Q The next sentence then says:

21 "If not mitigated this
22 self-accelerating process will lead to cell
23 rupture and the venting of toxic and highly
24 flammable gases and the release of heat."

25 Do you agree with that part?

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1 MR. LEVITES: Objection.

2 You can answer.

3 A Yeah.

4 Q Okay.

5 So, once the reaction, the exothermic
6 reaction, starts it would be self-perpetuating when
7 it gets to a certain temperature?

8 A Correct.

9 Q And then, it says:

10 "An ignition of those flammable gases
11 can lead to a possible explosion or fire."

12 Do you agree with that?

13 A Yes.

14 MR. LEVITES: Objection.

15 You can answer.

16 Q Okay.

17 Then let's turn to tab 23, which I
18 marked as Exhibit 7. And this is another article.

19 The one right before it.

20 A Also not something I refer to.

21 Q Right.

22 Did you refer to --

23 Did you review any literature or
24 articles involving the failure of lithium-ion
25 batteries before you came to your conclusions in your

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1 report?

2 A I am not sure.

3 Q Do you recall ever doing a literature
4 search to educate yourself about failure modes for
5 lithium-ion batteries?

6 A Well, wait. Now that I think about it,
7 there was a --

8 I read a few things. I can't tell you
9 right now sitting here what they are. One of them
10 was --

11 I looked at a couple of things, yeah.
12 Okay. So, here is the deal. I can provide you with
13 a list of a few things that I read. It's not as
14 though I read something in a report and said oh, I am
15 going to put that in my report. Okay? But in
16 looking for background at lithium-ion batteries,
17 there were a few things I reviewed and if you'd like
18 I will put that on my list of stuff to get for you.

19 Q Thank you.

20 Are these articles that you reviewed
21 recently or in the distant past before you got this
22 case?

23 A Yes, both. In other words, there may
24 have been a case a few years ago and somebody said
25 "Here is this interesting paper," and I read it and

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1 then I put it away and for some reason I had some
2 reason to go back to it recently so I look at it
3 again. So, they are that class, before and after.
4 Both.

5 Q So, did you deliberately do any
6 particular literature research for this case to look
7 at failure modes for lithium-ion batteries?

8 A I don't think so.

9 Q Did you review the papers that --
10 You reviewed --
11 Withdraw that question.

12 You reviewed Dr. Martin's report,
13 correct?

14 A I did.

15 Q Did you review the papers that Dr.
16 Martin cited in support of his opinions in this case?

17 A I don't remember.

18 So, should we go back to his report and
19 look at what he is citing?

20 Q This is one of the reports that he
21 cited and the one that we just looked at is one of
22 the reports. And we will look at a third.

23 A No.

24 Q You don't remember?

25 A I did not look at these. This is the

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1 first time I am seeing these two documents.

2 Q Okay.

3 But you had Dr. Martin's report that
4 cited these articles prior to your deposition today,
5 correct?

6 A Correct.

7 Q And you had the citations that you
8 could have looked for but you just chose not to?

9 MR. LEVITES: Objection.

10 You can answer.

11 Q Is that true?

12 A Yeah, I chose not to because I think
13 part of what I was interested in was in the other
14 stuff that I already had.

15 Q Okay.

16 A I didn't need to look at these.

17 Q Okay.

18 And I don't think actually you've
19 looked at any articles per se that you reference in
20 your report, correct?

21 MR. LEVITES: Objection.

22 You can answer.

23 A I don't think I have a list of
24 references. On the first page where I list what I
25 reviewed, there is not any articles there about

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1 lithium-ion battery failures.

2 Q Right.

3 So, looking now at the Sorenson article
4 we marked as Exhibit 7, the second paragraph under
5 introduction, I want to ask you about.

6 And it says:

7 "Lithium-ion batteries have a variety
8 of failure modes that are caused by a
9 series of abuse conditions, mechanical
10 abuse such as a collision crush
11 penetration, electrical abuse such as
12 external and internal short circuits,
13 overcharge, over-discharge and thermal
14 abuse such as overheating."

15 Do you see that sentence?

16 A Yes.

17 Q Do you agree with that?

18 A Yes.

19 Q So, one of the failure modes or several
20 of the failure modes involve short circuits,
21 overcharge, over-discharge and thermal abuse such as
22 overheating?

23 MR. LEVITES: Objection.

24 You can answer.

25 A Yes.

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1 Q Those are known failure modes that
2 could lead to thermal runaway?

3 MR. LEVITES: Objection.

4 You can answer.

5 A Yes. I am not sure those are
6 everything, but those are things. Those are causes
7 of thermal runaway.

8 Usually where there is silence for 30
9 seconds I ask is there a question pending?

10 MR. LEVITES: There is no question,
11 Donald.

12 THE WITNESS: Thank you.

13 COURT REPORTER: We can't hear you. I
14 see your mouth is moving.

15 MR. LEVITES: We can't hear you, Steve.
16 You are off mute, but I don't know if you
17 are trying to talk.

18 VIDEOGRAPHER: Would you like to go off
19 the video while we figure this out?

20 MR. LEVITES: Yes. Let the record show
21 he is indicating yes.

22 VIDEOGRAPHER: The time is 12:56.

23 We are going off the video record.

24 (Whereupon, a short break was taken)

25 VIDEOGRAPHER: The time is 12:57, and

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1 we are back on the video record.

2 Q Sorry about that, Mr. Galler.

3 The question I had for you was whether
4 the sentence that says:

5 "The outcome of one or more of these
6 abuse conditions can result in parasitic
7 and exothermic reactions occurring between
8 the electrolyte, solid electrolyte
9 interphase, and the positive and negative
10 electrodes."

11 And my question was is that a
12 description of thermal runaway?

13 MR. LEVITES: Objection.

14 You can answer.

15 A Well, I guess you are asking me does
16 the second sentence describe thermal runaway?

17 Q That's right.

18 A There is an exothermic reaction that
19 occurs in --

20 You know, that's in the sentence, and
21 that occurs in thermal runaway. Although it doesn't
22 --

23 It's not clear to me you are talking
24 about runaway from that sentence alone. But the
25 phrase "parasitic and exothermic reactions" sounds to

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1 me like they are still talking -- they are talking
2 about thermal runaway. In other words, a progressive
3 situation which continues to get worse. A
4 progressive situation and it generates a lot of heat.
5 I am not sure -- I am not sure you know --

6 I am not sure why you are focusing on
7 that sentence. I either use this sentence or don't
8 use this sentence. I mean, it's sitting there.

9 Okay. Great.

10 Q Okay.

11 Regardless we will move on.

12 If you turn the page?

13 A Staying in the same tab.

14 Q Same tab. Page 2 of the Sorensen
15 article.

16 A Okay.

17 Q In the carryover paragraph from the
18 first page, you will see that there is a sentence
19 that says:

20 "TR --"

21 which is thermal runaway.

22 "-- could be separated into three
23 stages as indicated in figure one."

24 Do you see that sentence?

25 A Yeah, I see that.

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1 Q Then it says:

2 "Where stage I indicates the safe
3 temperature range in which the cell can be
4 operated, stage II indicates the stage at
5 which TR or thermal runaway has begun to
6 cause irreparable damage to the cell."

7 And then, in parenthesis it says:

8 "Complete destruction can be avoided by
9 proper cooling of the cell."

10 "Then stage III indicates the stage at
11 which complete cell destruction is
12 unavoidable and the rapid discharge of
13 energy shortly follows."

14 And my question to you is do you agree
15 with that description of the three stages
16 of thermal runaway?

17 MR. LEVITES: Objection.

18 You can answer.

19 A Well, in general, I agree with that.

20 But I think you sort of --

21 I am tempted to say I am the electrical
22 engineer, not the battery expert. You are asking me
23 to comment on things I never read before and I didn't
24 reference. And these three pages make sense to me.
25 I understand them.

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1 Q Understood.

2 So, then there is a figure and it shows
3 different temperatures at which it goes from stage
4 one to stage two and then from stage two to stage
5 three. And the temperature that goes from stage one
6 to stage two, according to this article, is 117.6
7 degrees Celsius. And the temperature that it goes
8 from stage two to stage three where it's irreparable
9 damage and can't be stopped is 198.5 degrees Celsius.

10 And my question to you is do you agree
11 with that description of the temperatures at which
12 those different phases change or do you have some
13 other temperatures that you believe are the correct
14 temperatures to describe these phases of thermal
15 runaway?

16 MR. LEVITES: Objection.

17 You can answer.

18 A I think you are asking me to opine
19 about whether this graph makes sense and if I agree
20 with it as if I am a battery expert. I am not a
21 battery expert. Okay? Somebody who studies the
22 science and the physics of the batteries. And so, I
23 don't have in my mind, or other literature that I
24 read, a diagram that looks like this from an
25 independent source so that I can make a reasonable

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1 answer --

2 So, I think your question is do I agree
3 with this figure. I can't agree with that figure
4 unless I see other independent data. I have not
5 researched the runaway in that detail to look for
6 those temperatures. So, I can't either agree or
7 disagree with that diagram. I can't do that.

8 Q Let me ask you a different way.

9 You have given the opinion that thermal
10 runaway can occur from external heating sources,
11 correct?

12 A Yes.

13 Q Okay.

14 At what temperatures does thermal
15 runaway occur from external heating sources?

16 MR. LEVITES: Objection.

17 You can answer.

18 A Well, it depends. If you are asking me
19 at what temperature the battery is at or what
20 temperatures the air is at, what I am saying is I
21 don't know exactly what those temperatures are.

22 But I know that if you get a battery
23 hot enough you can induce thermal runaway. If it's
24 got stored charge in it, it will go into thermal
25 runaway. There are several causes of that. I don't

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1 know exactly what temperatures they occur at. But I
2 will tell you that when it begins, the battery --

3 Depends on what temperature the battery
4 is at before the process begins and what temperature
5 is the surrounding area. So, I can't tell you
6 exactly what those temperatures are.

7 Q You've given the opinion that in your
8 opinion thermal runaway occurred in this case because
9 of external heat, correct?

10 A Yes, that's correct.

11 Q And you are saying you don't know what
12 temperature the internal contents of the battery
13 would have to reach from the external heating to go
14 into thermal runaway?

15 A What I am saying is the internal
16 temperature of the battery and the air temperature
17 surrounding make a difference.

18 Q My --

19 A Now, I could tell you --

20 Q My question is what temperature did the
21 internal components of the battery have to reach to
22 go into thermal runaway?

23 MR. LEVITES: Objection.

24 You can answer.

25 A Well, I can tell you this. There are a

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1 couple of test standards. One of them is a --
2 (indecipherable audio) -- standard. I think it was
3 like UL have the same number. And it is a heating
4 test. And they heat the battery. And the batteries,
5 when they are manufactured and they are trying to see
6 do they comply with the UL standard, they heat them
7 to 130 degrees C for ten minutes. And then, they
8 have to survive that. In other words, they can't go
9 into thermal runaway. So, at some point above 130
10 degrees C, batteries can or are sort of visualized as
11 being able to go into thermal runaway because they
12 have been tested up to that temperature.

13 Q So, the answer is you don't know what
14 the temperature --

15 A I --

16 Q Let me finish my question. Then you
17 can answer.

18 You do not know the temperature that
19 the internal contents of a battery have to reach
20 before they go into thermal runaway other than it's
21 in excess of 130 degrees Celsius?

22 MR. LEVITES: Objection.

23 You can answer.

24 A Right.

25 Q But you've given the opinion that the

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1 temperature in the room where the fire -- where the
2 laptop was in this case was sufficient to put them,
3 the battery cells, into thermal runaway?

4 MR. LEVITES: Objection.

5 You can answer.

6 A That's right. I see the plastic
7 melted. Plastic melts above 200 degrees C. And that
8 means the laptop was getting close to 200 degrees C.
9 So, that's above 130. So, there you go. It's above
10 130.

11 Q Let's turn to tab 7 that I've marked as
12 Exhibit 8.

13 Now, this is a document I believe you
14 have familiarity with, correct?

15 MR. LEVITES: Just bear with me a
16 moment.

17 Tab 7, you said?

18 MR. SCHWARZ: Tab 7.

19 A Yes.

20 Q Is that correct that you reviewed this
21 specification for the HP 6-cell battery specification
22 for the laptop series in question here?

23 A Yes.

24 Q Now, we talked previously that HP
25 doesn't make these battery packs. It has a

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1 specification that has to be met by any of the
2 vendors that it allows to make the batteries for
3 them?

4 A Correct.

5 Q And that specification has to be met in
6 order for the HP to accept that vendor as a battery
7 manufacturer for them?

8 A That's my understanding.

9 Q Now, the first section under "General"
10 states that:

11 "This specification is based on the
12 smart battery data specification Revision
13 1.1. MU06062 --"

14 I'm sorry. Revision 1.1.

15 That's the end. I am sorry.

16 Are you familiar with the smart
17 battery data specification revision 1.1?

18 A I am not sure about the revision
19 number, but I know there's a smart battery data
20 specification.

21 Q What is the smart battery data
22 specification?

23 A The industry, the computer and battery
24 pack industry, have agreed upon pieces of data that
25 the computer and the battery pack interact and they

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1 communicate. And the smart battery data
2 specification governs that communication in the sense
3 of not how does the communication take place but what
4 does it mean. So, like, for example, there is
5 something called battery voltage, battery current,
6 battery temperature. There is a whole bunch of
7 parameters and that's a part of the smart battery
8 data specifications. So, that means in that document
9 it means the computer can ask for those things. Some
10 of the things that I just listed and many more.
11 Let's say battery temperature. And then, the battery
12 pack will respond back with a battery temperature.

13 Q If you turn to tab 21 just quickly?

14 You don't have to spend a lot of time
15 with it, but I marked this as Exhibit 9. And this is
16 the smart battery data specification.

17 I will just ask you to confirm that?

18 A Yeah, that's what it looks like.

19 Q Okay.

20 A Hang on. Let me just --

21 MR. LEVITES: I will do the same.

22 A Okay. So, if you look at page 11 --

23 I am sorry. I just wanted to see.

24 There is a table I was looking for. Oh okay. I
25 found what I was looking for. I am sorry for the

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1 delay.

2 Would you like to go back to the
3 previous document that you --

4 Q Yes. Thank you.

5 A I am sorry. I lost --

6 Q Seven.

7 A I misplaced my phone in the tabs.

8 Seven. Oh, the battery pack. Sure. Okay.

9 Q So, the smart battery data
10 specification is a uniform industry standard
11 communication standard for batteries and peripherals,
12 correct?

13 A It's not the communications standard.

14 I am just trying to --

15 Q I will withdraw that question.

16 We can move on. I don't want to
17 belabor that point.

18 If we look down at Exhibit 8, which is
19 tab 7, which is the specification, there is a section
20 that says, "Approved Fuel Gauges," correct?

21 A Yes.

22 Q That's Section 2.4.1.

23 And there are --

24 First of all, what is a fuel gauge in a
25 battery pack?

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1 What does that mean?

2 A Well, it keeps track of the charge in
3 the battery. So, that's its name, but it does a
4 bunch of other things, too, usually. So, usually
5 what it does is it also has some safety functions
6 associated with it and it can communicate with the
7 computer. So, if the computer says --

8 When you look turn your laptop on and
9 you click on the battery thing, it says 66 percent
10 charged, that's --

11 The computer has interrogated or asked
12 a question to the fuel gauge chip on the BMU and the
13 fuel gauge chip says I'm at 66 percent charge or
14 whatever the number is. So, that's one of the
15 functions.

16 The other functions are things, like,
17 monitoring the individual cell voltages. Monitoring
18 the temperature of the battery pack. There is a few
19 things that it does.

20 Q And it's basically a chip or a micro
21 processer, correct?

22 A Correct.

23 Q And it has a variety of the functions
24 that you've just described and others that you
25 haven't described, correct?

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1 A Correct.

2 Q So, what HP did in this specification
3 for this particular laptop is they said here are the
4 fuel gauges that are made by other companies that are
5 acceptable to us to put into the battery management
6 system?

7 A Right.

8 Q And they list, I believe, seven Texas
9 Instruments' fuel gauges, right?

10 A Six. But that's okay.

11 Q Okay. Six. I'm sorry. I counted
12 wrong.

13 And they approved one Maxim and one
14 Renesas?

15 I don't know how to say that.

16 A I think it's pronounced Renesas. I
17 don't know how to pronounce it. But, yes.

18 Q So, obviously HP was familiar and
19 studied all of these fuel gauges and decided that
20 these were acceptable for its battery packs for this
21 laptop?

22 MR. LEVITES: Objection.

23 You can answer.

24 A I think that's --

25 The way you put it is correct.

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1 Q Okay.

2 A The battery pack for this laptop. I
3 think it can be a battery pack for lots of laptops,
4 but.

5 Q Right. Because the battery packs --
6 The specifications for battery packs
7 wouldn't be that different from one laptop to
8 another?

9 A Right. Depending --
10 I mean, if it's a 6-cell battery pack,
11 it might be lots of battery -- lots of computers that
12 HP makes that uses the same battery pack.

13 Q Okay.

14 So, the model --
15 Withdraw that question.

16 Now, below the Approved Fuel Gauge
17 section, there is a 2.5 that says "Temperature Sense
18 Capability."

19 Do you see that?

20 A I do.

21 Q And the specification says:
22 "The battery pack shall have a
23 temperature sensor thermistor."

24 What is a thermistor?

25 A It is a --

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1 It's another term that you maybe don't
2 understand. Okay. It is a resistor. And resistors
3 have values. It's a fundamental electronic
4 component. And then you have values. You buy one
5 that is 10,000 ohms or 20,000 ohms. They are
6 measured in ohms. That's actually a guy's name,
7 O-H-M. So, that's the unit of measurement of the
8 resistance. And a thermistor is what changes its
9 resistance depending on the temperature. So, it's
10 basically a temperature sensor part. Two leads. I
11 don't know if that answers your question.

12 Q Sure.

13 So, a thermistor is a device that in
14 this instance is put in or near the cells around the
15 battery pack to communicate temperature information
16 to the laptop?

17 A The sensor could be hooked up to
18 communicate directly with the laptop or it could be
19 hooked up to the fuel gauge chip.

20 Q Right.

21 A And maybe both. Maybe two different
22 thermistors. But I am saying -- yeah. Okay.

23 Q And in this particular case, and we
24 will get into it in detail, but in this particular
25 case for this particular laptop there was a

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thermistor that was connected to the fuel gauge and also a thermistor that was connected through pin 6 directly to the control of the laptop.

4 Do you recall that?

5 MR. LEVITES: Are you talking about the
6 subject notebook or the model generally?

7 MR. SCHWARZ: Model generally.

8 MR. LEVITES: You got that, Donald?

9 Q If you can't answer that question, we
10 will get to the documents.

11 A I believe that that's correct. But I
12 just, you know, when I answer those questions, I
13 usually like to look at the schematic and see where
14 the two thermistors are and I can tell you. Without
15 looking at the battery schematics, I shouldn't answer
16 the question. But I think you are right because
17 there is two.

18 Q Okay.

19 A Pretty common on the HP pack that there
20 is two.

21 Q And then, the next section says:

22 | "Safety Functions 2.6."

23 And this is, again, of Exhibit 8.

24 And it says:

25 "The battery pack shall be built with

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1 the following safety protection functions."

2 And it says:

3 "Overcharge, over-discharge, over
4 current, over temperature, reverse charge,
5 cell imbalance and short circuit
6 protection."

7 Do you see that?

8 A I do.

9 Q Now, are those safety functions that
10 are, at least, partially intended to prevent thermal
11 runaway?

12 A Most of them are. So, for example,
13 overcharging and over-discharge, overcurrent, over
14 temperature is certainly one. Reverse charge. I am
15 not sure so much of reverse charging. Cell
16 imbalance. So, many of them are designed
17 specifically to prevent thermal runaway. I can't
18 think of a single one that --

19 But most of them are.

20 Q And other than the over temperature
21 function, which may also be connected directly to the
22 motherboard of the device, the rest of them typically
23 are controlled through the fuel gauge, correct?

24 A Right. Meaning --

25 And I presume what you mean is the

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1 fuel -- the fuel gauge measure is a function. Let's
2 say overcharge or cell imbalance. And the computer
3 can access the fuel gauge chip and tell if those
4 things are happening.

5 Q Right. Okay. Then we are on the same
6 page.

7 Now, the specifics of --

8 The specifics of the settings for this
9 particular specification for the fuel gauge appears
10 on page 5 of 12, Section 6, and goes on to page 6 of
11 12.

12 A Yes.

13 Q And so, what this says is that that
14 fuel gauge has to do certain things when certain
15 conditions are present, right?

16 A Correct.

17 Q Okay.

18 So, the first one I want to talk about
19 is on page 5 of 12 is the cell overcharge voltage.

20 You with me?

21 A Yes.

22 Q Okay.

23 So, when the cell voltage goes to 4.40
24 volts to 4.45 volts, it will blow the fuse after
25 three seconds, three to nine seconds, correct?

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1 A That's what it says.

2 Q So, these devices, these battery
3 management systems, have two different ways of
4 cutting the power from the charger, right?

5 A At least.

6 Q Okay.

7 A The reason I am hesitating is that I am
8 not sure if there are more than two, but there are
9 certainly two. So, go ahead.

10 Q Let's just describe the two and then
11 you can tell me what others may exist that I don't
12 know about.

13 A Okay.

14 Q So, one of the systems is what is
15 called a C-FET?

16 A Yes.

17 Q One of the ways that the fuel gauge can
18 disconnect power to the battery pack from the charger
19 is using something called a C-FET or a charging FET,
20 correct?

21 A Correct.

22 Q And that's like a --

23 I mean, it's got -- I am sure a more
24 technical description -- but it's like a switch?

25 A Correct. It's like a switch. The fuel

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1 gauge can turn on and off.

2 Q Right.

3 So, when the voltage goes above a
4 certain level for a certain amount of time, one thing
5 that could happen is there is a switch that can be
6 turned off, but another thing that could happen is a
7 fuse is blown?

8 A Correct.

9 Q And once a fuse is blown, that's like a
10 failsafe. That means that then the battery pack is
11 going to be inoperable after that fuse is blown?

12 A Completely inoperable. Done. If you
13 put it in the laptop, it will say there is no battery
14 here.

15 Q Okay.

16 So, that's sort of failsafe mechanism.
17 But the C-FET, if it's turned off, that
18 can be turned back on once that condition resolves?

19 A Correct.

20 Q So, it's sort of like a double --
21 They have a double system to cut power
22 to the battery under certain circumstances. One that
23 can be turned on and off and one that will kill the
24 battery forever?

25 A Right.

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1 Q And if you turn to the next page, which
2 is page 6 of 12 of Exhibit 8, there is a cell voltage
3 imbalance protection during charging.

4 A Do you see that?

5 Q Yes.

6 Q And what that means is that the fuel
7 gauge is going to monitor the state of charge of all
8 the cells so that the difference between charge
9 levels in the cells remains relatively close?

10 A Correct.

11 Q Because you don't want one cell --

12 A I'm sorry. Maybe I answered something
13 as if it was a question and I wasn't supposed to.

14 Q No, you are doing fine.

15 So, the question I have is I am just
16 trying to describe what that is and make sure I
17 understand it correctly.

18 In other words, the HP does not want
19 the battery pack to have some cells charged at a much
20 higher level than other cells?

21 MR. LEVITES: Objection.

22 You can answer.

23 A That's correct.

24 Q Because if any cells get overcharged,
25 it creates this risk of thermal runaway?

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1 A Correct.

2 Q And the fuel gauge is designed to
3 provide that functionality to report on cell balance?

4 Right?

5 A Your question had a couple of terms in
6 one sentence that --

7 Q Let me rephrase it because I --

8 A Okay.

9 Q Let me rephrase it.

10 A Okay.

11 Q So, it says here that if the cell
12 imbalance occurs at a particular amount, after 15 to
13 25 seconds, the fuel gauge is supposed to turn off
14 that switch, the C-FET?

15 A And blow the fuse.

16 Q And blow the fuse.

17 So, in this instance, it uses both --

18 Well, the specification requires that
19 both of these devices be used to shut off power to
20 the battery pack if there is cell imbalance?

21 A Correct.

22 Q Then a little bit below on this chart
23 there is an over-temperature protection for charging
24 section.

25 That is a specification as to what the

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1 fuel gauge needs to do under certain circumstances,
2 correct?

3 A Yes.

4 Q And in that instance it indicates that
5 if the temperature of the battery cells is greater
6 than 46 degrees Celsius or greater than two sections,
7 then the charging current should be turned off using
8 the C-FET?

9 A Correct.

10 Q And then, if the temperature then dips
11 back below or to 45 degrees Celsius, it can flip that
12 switch back on?

13 A Correct.

14 Q Now, you said that your understanding
15 is that the temperature at which thermal runaway
16 occurs is somewhere greater than 130 degrees Celsius?

17 A Yes. That's only based on --

18 I say only based on, based partly on
19 the UL standard. If the batteries were past the UL
20 standard, then the testing for heating is, say, heat
21 the cells to 130C for ten minutes and the batteries
22 have to survive that. They can't go to thermal
23 runaway under those conditions. So, that means that
24 if you had HP batteries or somebody else's or
25 something like that that were UL tested and you think

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1 it went into thermal runaway, then they should have
2 been exposed to a temperature much higher than 130C.
3 Because otherwise it --

4 The same temperature that they were
5 tested to and should have survived that. That's
6 where one of those numbers comes from.

7 Q In any event, the amount or the
8 temperature that HP has specified that the power be
9 shut off to the battery pack is much lower than that
10 130 degrees. It's only 46 degrees Celsius.

11 A Correct?

12 Q Correct.

13 Q So, HP wants a margin of error that
14 would be a safe range and make sure that charger is
15 turned off before it gets to anywhere near 130
16 degrees?

17 A MR. LEVITES: Objection.

18 A Correct.

19 MR. LEVITES: Let's take a break now.

20 MR. SCHWARZ: Hold on a minute. Let me
21 just see. I am almost done with this.

22 Okay. We can take a break. Do you
23 want to eat lunch now?

24 THE WITNESS: I do. I am hungry.

25 MR. SCHWARZ: What would you --

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1 Let's go off the record first and we
2 can discuss this.

3 VIDEOGRAPHER: The time is 1:33.

4 Going off the video record.

5 (Whereupon, a lunch break was taken)

6 VIDEOGRAPHER: The time is 2:01.

7 We are back on the record video record.

8 Q If you turn to tab 9 in your binder,
9 which I've marked as Exhibit 10.

10 A Yes.

11 Q Earlier today in the deposition we
12 talked about sort of a redundant thermistor system
13 that the HP Pavilion series laptops were intended to
14 have where the thermistor is connected directly to
15 the computer itself to the motherboard.

16 Do you recall that?

17 A Yes.

18 Q And this document that we have marked
19 as Exhibit 10 are the interrogatory answers to the
20 Plaintiff's Third Set of Interrogatories.

21 And interrogatory number one provides
22 that information about what was intended to be
23 designed into this laptop.

24 Do you agree with that?

25 A Yes.

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1 Q And it basically says that independent
2 of the fuel gauge a thermistor was to be connected
3 directly to the internal controller on the computer
4 and when the temperature exceeded above 45 degrees
5 Celsius, it would discontinue the charge?

6 MR. LEVITES: Objection.

7 You can answer.

8 A Yes. That thermistor is on the battery
9 pack or is supposed to be on the battery pack.

10 Q Right.

11 Instead of being connected to the fuel
12 gauge, it was connected directly to the motherboard?

13 A Correct. That's correct.

14 Q And it gave the computer, then,
15 independent of the fuel gauge a device by which it
16 can discontinue the charge if the temperature got too
17 high?

18 A Correct.

19 Q Now, we talked about the HP
20 specification, which is Exhibit 8, tab 7, that there
21 were six different fuel gauges made by Texas
22 Instruments for the battery pack that were approved
23 by HP.

24 A Yes, there were six.

25 Do I turn back to that tab 8 or do I

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1 not?

2 Q Exhibit 7. You can.

3 A Exhibit 7. I see.

4 Yeah. Right. Okay.

5 Q Tab 7. Exhibit 8.

6 My apologies for confusing you.

7 That's an indication that --

8 Withdraw that question.

9 And as we said previously, there were
10 six Texas Instruments' fuel gauges but only one from
11 two other companies?

12 A Correct.

13 Q So, Texas Instruments would appear to
14 be the main supplier of fuel gauges to HP at least
15 during this period of time?

16 MR. LEVITES: Objection.

17 You can answer.

18 A Could you please repeat the question?

19 Q Sure.

20 It would appear that HP prefers Texas
21 Instruments' fuel gauges over other companies' fuel
22 gauges during this period of time?

23 MR. LEVITES: Same objection.

24 A Just because they are listed that way,
25 I can't infer any preference on the part of HP. I

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1 see the way it appears. I see the way it appears.
2 But you are basically asking me what is HP's attitude
3 towards something, but I am not HP. I can't tell you
4 what their attitude is --

5 Q Certainly that would show a familiarity
6 between the two companies though, correct?

7 A Correct.

8 Q And Texas Instruments makes a number of
9 computer components beyond just fuel gauges, right?

10 A Lots.

11 Q And have you encountered other Texas
12 Instruments devices inside HP laptops other than fuel
13 gauges?

14 A They are very common in the electronics
15 business and so I wouldn't be surprised if I did.
16 But as I am sitting here right now, if you say,
17 "okay, show me one," I can't show you one.

18 Q And --

19 A Texas Instruments is such a prolific
20 company. That BQ number, that's not really
21 originally a Texas Instruments number at all. It is
22 a different company that Texas Instruments purchased.
23 And so, they incorporated the model numbers because
24 it was easier for their customers to know hey, that's
25 where I am getting this part now. Not purchasing it

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1 from the original company. Purchasing it from TI.
2 And I guess TI bought all the rights to the designs
3 of those parts. And so, TI is very prolific. If you
4 pick up a circuit board, and it's 5 inches on the
5 side, it is a 90 percent chance there is going to be
6 a TI chip somewhere.

7 Q So, Texas Instruments is a leader in
8 the industry, correct?

9 A That's correct.

10 Q So, if you could turn to tab 10 now,
11 which I marked as Exhibit 11.

12 A I got that.

13 Q Now, this is a Texas Instruments
14 application report from July of 2005.

15 Do you see that?

16 A I do.

17 Q And have you seen this particular
18 application report prior to me showing it to you now?

19 A Yes.

20 Q Have you seen other application reports
21 that Texas Instruments from time to time publishes
22 and distributes?

23 A On this topic or on other topics?

24 Q On many topics.

25 A On many topics, yes.

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1 Q Okay.

2 And then, as you said, they are a
3 leader in the field so their application reports are
4 typically given some credence, correct?

5 MR. LEVITES: Objection.

6 A Correct.

7 Q Now, this particular application report
8 involves battery authentication and security schemes,
9 right?

10 A Correct.

11 Q And you read this?

12 A I haven't studied it in detail, but I
13 read it. Somehow it looks a little bit --

14 I think I saw another version of the
15 same --

16 It looks a little different to me, but
17 generally I am familiar with it.

18 Q I think there was a 2014 version as
19 well.

20 Could that be what you are talking
21 about?

22 A That could be. That could be what I
23 was looking at. Because I think it covers the same
24 things, but it was a little bit, like, a couple of
25 pages shorter or something.

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1 Q Okay.

2 But in any event this one is from 2005.
3 And that's five years before the laptop
4 at issue in this case was manufactured; is that
5 correct?

6 MR. LEVITES: Objection.

7 You can answer.

8 A Correct.

9 Q And this is an application report that
10 Texas Instruments put out to describe different ways
11 that laptop and other peripheral manufacturers could
12 provide protection against counterfeit battery packs,
13 correct?

14 MR. LEVITES: Objection.

15 You can answer.

16 A Authentication.

17 Q Right.

18 And authentication means that some
19 system by which if a battery pack is replaced, that
20 the laptop or the peripheral that uses a lithium-ion
21 battery type of battery pack can determine whether
22 it's an authorized pack or not?

23 A Correct.

24 Q So, the abstract begins with the
25 statement that:

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1 "Driven by integrated functionality and
2 shrinking form factors, the demand for
3 portable devices, such as cellular phones,
4 PDAs, and DVD players, has grown
5 significantly during the last several
6 years."

7 And my question would be and that
8 would also apply to laptops, correct?

9 MR. LEVITES: Objection.
10 You can answer.

11 A Yes.

12 Q And it says:

13 "These portable devices need
14 rechargeable batteries and peripherals that
15 must be replaced before the life of the
16 portable devices expires."

17 Do you agree with that?

18 MR. LEVITES: Objection.
19 You can answer.

20 A Yes.

21 Q So, in 2005, the time period between
22 2005 and 2010, is it true that the lifetime of
23 batteries for these types of peripherals for laptops
24 and other types of devices that use lithium-ion did
25 not last as long as they do today?

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1 MR. LEVITES: Objection.

2 You can answer.

3 A That's probably correct.

4 Q And so, back in that year, then, it was
5 foreseeable that the useful life of a laptop would
6 likely exceed the life of a battery pack if it was
7 used frequently?

8 MR. LEVITES: Objection.

9 You can answer.

10 A Yes.

11 Q And so, it was, then, foreseeable that
12 purchasers of laptops in this era between 2005 and
13 2010 would likely have to purchase a replacement
14 battery at some point to use in the lifetime of the
15 laptop?

16 MR. LEVITES: Objection.

17 You can answer.

18 A Yes.

19 Q In addition to that, many users would
20 like to get another battery pack that would work in
21 the laptop even before the first one becomes
22 nonfunctional because that would enable them to
23 extend their battery time on the laptop, right?

24 MR. LEVITES: Objection.

25 You can answer.

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1 A I guess that's one policy; buying one
2 ahead of time.

3 Q Right.

4 And that was a pretty common occurrence
5 back in this period of time when batteries didn't
6 last as they do now?

7 MR. LEVITES: Objection.

8 You can answer.

9 A I am not sure if I want to characterize
10 what would happen in a common occurrence.

11 Q The manufactures --

12 A You can argue with me all you want. I
13 am not going to make a societal judgment about what
14 people did or didn't do.

15 Q And you have no personal knowledge of
16 that?

17 You never bought an extra battery for
18 your battery pack for any laptop that you had?

19 A I didn't say that. I just said I
20 wasn't making a societal judgment.

21 Q Then let me ask you this.

22 Did you actually do that in your own
23 personal use of laptops; buy an extra battery so you
24 had one charged when the other one ran out?

25 MR. LEVITES: In 2005?

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1 A I don't remember doing that.

2 Q Okay.

3 A I mean, maybe I did it, but I don't
4 remember doing that.

5 And also, having done work for HP, I
6 would probably buy an HP battery pack except, you
7 know, a third-party one.

8 Q Did they give you a discount?

9 A No.

10 Q So, then this Texas Instruments
11 application report says:

12 "As a result of the demand for these
13 devices and the fact that the useful life
14 of the device is likely to outlast the
15 batteries, it opened a huge market for
16 counterfeiters to supply cheap replacement
17 batteries which may not have the safety and
18 protection circuits required by the
19 original equipment manufacturer."

20 Are you familiar with that concept?

21 MR. LEVITES: Objection.

22 A I sure am.

23 Q So, back in 2005 it was generally
24 recognized that there may be replacement batteries
25 that are being purchased that lack certain safety

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1 features?

2 MR. LEVITES: Objection.

3 You can answer.

4 A Recognized by whom?

5 Q By the industry.

6 MR. LEVITES: Objection.

7 A Well, I can't speak for the industry.

8 Q Well, certainly, Texas Instruments is
9 saying that.

10 Are you saying that that wasn't
11 generally understood at that time?

12 MR. LEVITES: There were so many thaths
13 in that question, Steve. I didn't even
14 understand it.

15 MR. SCHWARZ: Okay.

16 Q Texas Instruments is saying that in
17 2005 that:

18 "A huge market for counterfeiters to
19 supply cheap replacement batteries and
20 peripherals which may not have the safety
21 and protection circuits required by the
22 original equipment manufacturer."

23 That that market had been opened as of
24 2005.

25 And my question is are you saying that

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1 you don't believe that was not generally understood
2 in the industry?

3 A No. I must have not understood the
4 question. So, that last sentence that you read, I
5 agree with that.

6 Q Okay.

7 And in fact, you had personal knowledge
8 of this because you were involved in some
9 investigations of HP laptop fires where battery packs
10 lacking safety features were detected?

11 MR. LEVITES: Objection.

12 You can answer, Donald.

13 A That's correct.

14 Q Okay.

15 So, clearly at least during the time
16 period that you were aware, HP was aware of that
17 because you made them aware of that?

18 A I -- I don't --

19 I made the people at HP and their
20 representatives aware of when I encountered a
21 third-party battery pack in an investigation. But
22 the characterization that I made HP aware of
23 something is a little bit overreaching for my taste.
24 In other words, it's not like I called up the
25 president of HP and said hey, Larry I got to tell you

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1 something. So, my communication was relatively
2 limited and those people knew what I was
3 encountering.

4 Q And in addition to finding third-party
5 battery packs, you were finding third-party battery
6 packs that lacked certain important safety features?

7 A Almost all the third-party battery
8 packs that I encountered lack --

9 But, yes, as a subset as well.

10 Q Okay.

11 And again, the counterfeiters were
12 making these battery packs as cheaply as they
13 possibly could and skimping on safety devices to do
14 so?

15 MR. LEVITES: Are you talking about
16 2005 or are you talking about when he
17 started working on this stuff ten years
18 ago?

19 MR. SCHWARZ: I am talking generally
20 now as a general concept.

21 A I think that it's generally correct
22 that they made their battery packs cheap and also
23 generally correct where they could they omitted
24 safety features to make the packs cheaper for them to
25 make them.

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1 Q And the cheaper they could make them,
2 the cheaper they could sell them and --

3 A Well, you know, I am not an economist,
4 but that seems pretty obvious to me.

5 Q And if it seems pretty obvious to you
6 then it was obvious to HP, right?

7 A I don't want to characterize HP's
8 thought process. Thank you.

9 MR. LEVITES: Objection.

10 Q Okay.

11 Now, in the next paragraph it says:

12 "These counterfeit batteries may
13 violate both mechanical and electrical
14 safety requirements related to
15 short-circuit protection, charge safety,
16 and other specifications."

17 And that's something that you just
18 agreed with?

19 A Yes. Correct.

20 Q And charge safety, in particular, we
21 have been talking about with regard to the fuel gauge
22 safety devices and also the temperature, over
23 temperature protection that we talked about, right?

24 A Correct.

25 Q And then, the next sentence says:

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1 "It is usually impossible for the
2 consumer to determine the quality without
3 making a purchase and possibly learning the
4 hard way."

5 Do you agree with that?

6 A Yes.

7 Q And in your experience in looking at
8 these what we call third-party battery packs or
9 counterfeit battery packs, have you encountered those
10 battery packs that actually have HP markings on them
11 even though they are not HP approved battery packs?

12 A Yes.

13 Q So, the consumer could purchase one and
14 believe it was an HP authorized battery pack based on
15 the markings?

16 A I am pretty sure they could, yeah.

17 Q And in fact, this particular battery
18 pack that was in the laptop that's at issue in this
19 case had those HP markings on them, right?

20 A Well, I am not sure I saw the case of
21 the battery pack. So, I can't --

22 Q You don't remember that?

23 A I don't remember seeing the case of the
24 battery. There may have been a piece in the debris.
25 But I wouldn't be surprised if when it was purchased

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1 it said "HP" on the outside.

2 Q Okay.

3 So, Texas Instruments is saying in this
4 2005 report is that there are ways that the laptop
5 manufacturers and other peripheral manufacturers can
6 institute authentication systems that would either
7 prevent a third-party battery pack from being used in
8 their device or at least provide a warning on the
9 screen to the user that it is not an authorized
10 battery pack, correct?

11 A I'm sorry.

12 Could you please repeat the question?

13 Q Sure.

14 What Texas Instruments is describing in
15 this application report, that we've marked as Exhibit
16 11, is that there are various different ways the
17 manufacturer of the devices that use these
18 lithium-ion battery packs can substantiate
19 authentication systems that would allow either or
20 that would prevent the third-party battery pack from
21 working in a peripheral or potentially provide a
22 warning to the user on the screen that it's not an
23 authorized battery pack?

24 MR. LEVITES: Objection.

25 You can answer.

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1 A Yeah, I think that's correct.

2 Q And this was 2005?

3 A That's the date of the document.

4 Q Okay.

5 You reviewed Mr. Atkinson's deposition
6 transcript, correct?

7 That was one of the items you reviewed?

8 A Yes.

9 Q And you also reviewed Mr. PiPho's
10 deposition transcript, correct?

11 A Correct.

12 Q Both Mr. Atkinson and Mr. PiPho said at
13 some point prior to the fire in this case they were
14 both aware of the same issue you were aware of, of
15 these third-party battery packs not having safety
16 devices?

17 MR. LEVITES: Objection.

18 You can answer.

19 A I believe that's correct.

20 Q Okay.

21 Now, in this Texas Instruments report,
22 as I said, there is a variety of different -- of
23 authentication systems that were available for use in
24 2005 by manufacturers like HP, right?

25 MR. LEVITES: Objection.

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1 A Correct.

2 Q And so, the simplest of those
3 authentication devices, which is not really a device,
4 would just be the form of the battery pack, right?

5 Like the battery packs for different
6 peripherals had different shapes and different
7 connections.

8 So, one way to prevent third-party
9 battery packs is just the shape and design, right?

10 A Correct.

11 Q But that's the easiest one to
12 counterfeit, right?

13 A Correct.

14 Q So, then there is another type of
15 authentication system which is a challenge and
16 response based authentication scheme that's listed
17 here on the second page of the 2005 Texas Instruments
18 application report?

19 MR. LEVITES: Objection.

20 Q Is that correct?

21 A Yes.

22 Q Are you familiar with the challenge and
23 response based authentication scheme?

24 A Generally.

25 Q So, under this type of scheme, just to

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1 see if you agree with me, that basically the device
2 like a laptop would send a signal to the battery pack
3 and the battery pack would send a signal back and if
4 the signals matched or if it was the right signal
5 back then that would be an authentication step?

6 Is that your understanding on how those
7 were?

8 A Yes.

9 Q Now, what makes these less secure than
10 other systems is that a battery counterfeiter could
11 purchase one of these laptops and figure out that
12 scheme and then just have its counterfeit battery
13 pack send the right signal back?

14 A Correct.

15 Q So, then there are more sophisticated
16 types of schemes and they are also listed from this
17 2005 document.

18 One is called the challenge and
19 response RC based authentication. And then, the most
20 sophisticated is the challenge and response SHA-1
21 based authentication implementation. That appears on
22 page 6.

23 Is that correct?

24 MR. LEVITES: Objection.

25 A Yes.

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1 MR. LEVITES: Before you go on, Steve,
2 I think you misspoke earlier when you
3 were --

4 I think you were describing under the
5 sub one, the identification --
6 (indecipherable audio) -- you said
7 challenge and response back when you were
8 discussing that. Now, you are referencing
9 it again. So, I am making sure we are
10 talking about two different things.

11 Q So, in this document, item number 4,
12 which is page 6, is entitled, "Challenge and Response
13 SHA-1 Base Authentication Implementation."

14 Correct?

15 On page 6?

16 A Yes.

17 Q And is that a type of authentication
18 system that you are familiar with?

19 A I am not --

20 I am not familiar with it. When you
21 say "familiar with it," meaning have I've seen these?
22 The answer is no. Do I understand what they are
23 talking about? The answer is pretty much mostly.
24 But I haven't studied them in any great detail.

25 Q Well, are you familiar with

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1 authentication systems of any type that use the SHA-1
2 algorithm?

3 A Nobody --

4 Well, first of all, SHA-1 has been
5 deprecated by the US government agencies because some
6 number of years ago they found that there was a way
7 people could get -- not get around it, but there is a
8 way they could expose a problem with SHA-1. SHA
9 stands for Secure Hash Algorithm.

10 Now, there is a second version of that.
11 And so, you could put SHA-2 in this diagram and
12 everything would read the same. It's just that the
13 original concept incorporated SHA-1, which was not
14 considered reliable anymore.

15 Q Okay.

16 So, at some point, then, the hackers
17 that were interested in breaking into systems that
18 use that algorithm were successful and the system was
19 upgraded, you are saying?

20 A They could -- not that -- the
21 hackers --

22 I'm not sure the hackers succeeded in
23 the process, but the possibility was there. So,
24 since SHA-1 was being used for banking transactions
25 and credit card transactions and government safety

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1 and top secret information codes and stuff like that,
2 the federal government said well, since we found a
3 problem with SHA-1, we might as well not use it
4 anymore. And they issued sort of a government wide
5 statement and a more sophisticated one called SHA-2
6 was developed. And that is what they use now. So,
7 that's what the chip --

8 I think the chips now use that instead.

9 Q Okay.

10 But in 2000 --

11 A It's just an encryption algorithm. You
12 put in a number. You get a really long complicated
13 other number that you can't tell how it corresponds
14 to the first number you put in but it's a process.

15 Q Right.

16 A So, if you repeat that process with the
17 same input number, you get the same output number,
18 but it is harder to sort of figure out how that
19 works. So, the counterfeiters has more work to do.

20 Q And that was --

21 The change from SHA-1 to SHA-2 didn't
22 happen in 2005.

23 That happened at some point after that,
24 correct?

25 A I think it was deprecated they called

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1 it. Meaning, we don't use it anymore. I think that
2 was in 2011 or something like that.

3 Q Okay.

4 So, as of the date of this document,
5 2005, SHA-1 was still being used for even
6 sophisticated entities like banks and financial
7 transactions and the government?

8 A Yeah, that's my understanding.

9 Q Okay.

10 So, that was what was available as of
11 2005 for a manufacturer like HP to use?

12 A Correct.

13 MR. LEVITES: Objection.

14 You can answer.

15 Q And what they --

16 The way these systems worked was that
17 the battery management system and particularly the
18 fuel gauge would have a similar ability to calculate
19 a number that would match the calculation that the
20 algorithm made from the laptop and that if they
21 matched then it would be deemed authentic, correct?

22 MR. LEVITES: Objection.

23 You can answer, Don.

24 A I think that's a pretty good
25 generalization of the scheme, yes.

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1 Q Now, if you could take a look at tab
2 16, which I marked as Exhibit 14, is a technical
3 reference for one of the fuel gauges that was specked
4 by HP to be used -- that could be used by a battery
5 manufacturer for this particular series of laptops.

6 If you want to check back to verify
7 that, I will tell you that you would want to look
8 at --

9 A Which tab?

10 Q Tab 7.

11 A I am pretty sure you are correct. But
12 just so we don't start off with the wrong foot, let's
13 verify that, okay? Because I think it is a 20Z90.
14 And yeah, 20Z90.

15 Q So, 20Z90 and 20Z95, this technical
16 reference covers both of them?

17 A Yes.

18 Q And 95 was also one of the specs?

19 A Okay. Fine.

20 Q So, then, if you could turn to page 85
21 of this document?

22 A 85.

23 Yeah. Okay.

24 Q There is a Section A.34.

25 Do you see that?

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1 A Yeah, I am reading it.

2 Well, I see that that --

3 I read that section. I understand part
4 of what they are talking about. I just don't know
5 how it --

6 I think this is really just saying
7 where is the data located.

8 Q What this indicates, does it not Mr.
9 Galler, is that this particular chip, the BQ 20Z90
10 and 20Z95 fuel gauge was equipped with the ability to
11 use this SHA-1 authentication scheme if the
12 peripheral that was being used with -- incorporated
13 that authentication scheme, correct?

14 MR. LEVITES: Objection.

15 A I think that's correct. Yes. That's
16 what it looks like to me.

17 Q And at the time --

18 And this document, by the way, is
19 dated, revised in 2007 on the first page, correct?

20 A Yes.

21 Q So, as of 2007, and three years before
22 this laptop was manufactured, Texas Instruments was
23 offering the fuel gauge that HP specced with this
24 SHA-1 algorithm authentication system that could be
25 implemented?

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1 MR. LEVITES: Objection.

2 You can answer.

3 A That's my understanding. But you
4 understand it is unclear that any computer
5 manufacturer is doing this.

6 Q Okay.

7 Well, we will get to that.

8 A And the reason --

9 Q We will get to that.

10 A There is no standard --

11 Q Okay.

12 A -- the industry --

13 Q Okay. We will get to that.

14 My question was does Texas Instruments
15 offer this fuel gauge that was specced by HP with the
16 ability to use the SHA-1 algorithm for
17 authentication, and I think the answer was yes?

18 A Correct.

19 Q And was this one of the technical
20 references that you were provided with to review to
21 prepare for your deposition?

22 MR. LEVITES: Objection.

23 You can answer.

24 A I was provided with the TI paper. The
25 one that is like -- I forget what number it was that

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1 we were in. It was the one before this that we were
2 looking at how the different authentication schemes
3 --

4 I was provided with that. And I am
5 pretty sure this thing --

6 I downloaded a technical reference
7 manual. It might not have been this exact chip. It
8 might have been the other ones. But it had a very
9 similar number. You see at the front of the document
10 where it says SLUU264A? It was a number like that.
11 And I saw that the SHA-1 stuff was in it, in the
12 chip. So, I am aware that the chips were able to do
13 that.

14 Q Okay.

15 Just quickly, one of the other chips
16 that was speced for this series of laptops that was
17 the series that included the subject laptop in this
18 case, was the BQ 20Z70 and BQ 20Z75.

19 And if you take a look at tab 14, you
20 will see the technical reference manual for that
21 particular fuel gauge. And that has been marked as
22 Exhibit 15.

23 A Okay.

24 Q Then if you turn to page 67 of that
25 document?

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1 And again, you will find the identical
2 Section A.34 that provides the identical data about
3 the SHA-1 algorithm of authentication system that was
4 available on that chip.

5 MR. LEVITES: Objection.

6 You can answer.

7 A Yes, I see that.

8 Q Then if you look at tab 15, which I
9 marked as Exhibit 16, and this is a 2008 version of
10 that same chip, the BQ 20Z70 fuel gauge and 75 fuel
11 gauge.

12 And if you look at page 67 of that
13 document, you will find the same Section A.34
14 authentication which provides the functionality for
15 the SHA-1 authentication platform, correct?

16 A Yes.

17 Q Then, finally, if you look at tab 13,
18 which is Exhibit 17, and you look at page 69, you
19 will see the technical reference manual from 2009,
20 revised in 2012, for the BQ 20Z40 and BQ 20Z45.

21 And it also on page 69 on Section A.34
22 indicates that this fuel gauge that was specced by HP
23 for this series of laptop also has the capability of
24 using the SHA-1 algorithm.

25 MR. LEVITES: Objection.

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1 You can answer.

2 A I see that.

3 Q Now, on page 18 of your report, you
4 indicate that the type of battery authentication
5 system that was available on all of these Texas
6 Instruments' fuel gauges for several years before
7 this particular laptop was manufactured wasn't
8 "industry standard."

9 Do you remember that?

10 A Can you just do me a favor and show me
11 where?

12 Q Tab one. Page 18 of your report.

13 A You were referring to something and I
14 am having trouble finding it.

15 MR. LEVITES: The second to last full
16 sentence, Don. Three lines up from the
17 bottom of the page. It begins, "This
18 indicates."

19 THE WITNESS: Oh, okay. I see. Yeah,
20 I see that. Okay. Now I am oriented.

21 Q Okay.

22 So, my first question is what is your
23 definition of industry standard?

24 A That computer manufacturers were not
25 implementing that type of authentication.

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1 Q So, are you saying that there were no
2 computer manufacturers in the world that were using
3 authentication systems for battery authentication in
4 2010?

5 MR. LEVITES: Objection.

6 You can answer.

7 A No. That is not what I said.

8 Q Okay.

9 That is what I am asking you.

10 So, you are saying that's --

11 A No. No. No. No. That's about the
12 fourth time you put words into my mouth.

13 Q I am not trying to put words in your
14 mouth, Mr. Galler. I am trying to understand.

15 Okay?

16 A When you say nobody in the world, I
17 never said nobody in the world. Okay?

18 Q Okay.

19 That's what I want to know.

20 A -- in that paragraph my experience of
21 tests that I did. Your expert has done a test.
22 Measurement. Calculation. Your electrical
23 engineering expert hasn't done any of those things.
24 And you are grilling me about what my tests mean?
25 The test is described there.

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1 Q Okay.

2 That's what --

3 A Why don't you read that and then you
4 can ask me a question.

5 Q I did read it, Mr. Galler. There is no
6 reason for you to get upset.

7 I am asking you this question.

8 Your determination of what industry
9 standard was, was based upon your review of three
10 different laptops that did not have authentication
11 systems; is that correct?

12 MR. LEVITES: Objection.

13 You can answer, Don.

14 A That's correct.

15 Q Okay.

16 Did you do any literature search to
17 determine whether some other manufacturers that you
18 didn't look at had implemented such systems?

19 A No, I didn't.

20 And the reason I didn't is because
21 those three companies were recognized as pretty big
22 producers in the US of portable computers. And
23 because in the case I was involved in, the opposing
24 expert said I know these three manufacturers have
25 authentication. So -- and -- and the replacement

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1 batteries, which were not non lithium batteries
2 worked. Which means either there was no
3 authentication or the authentication was there, but
4 it had been defeated by counterfeit battery makers.

5 Q So, let's get into this.

6 So, I am not trying to put words in
7 your mouth. I am just trying to restate what you are
8 saying so I understand it. So, just so you
9 understand I am not trying to mislead you.

10 A Okay.

11 Q Are you saying that your evidence for
12 the authentication systems not being industry
13 standard is based upon some work you've done in some
14 other case?

15 MR. LEVITES: Objection.

16 You can answer.

17 A Well, I described that. That happened
18 to be in connection with another case.

19 Q Okay.

20 So, which case was that, that you
21 purchased or you obtained these brands of computer to
22 determine whether they had authentication systems?

23 What case was that?

24 A Am I allowed to answer that question?
25 Should I answer that question?

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1 Q I think you have to.

2 MR. LEVITES: As long as it's not a
3 confidential or whatever --

4 THE WITNESS: No. It's not an ongoing
5 case.

6 A The case was called Skaggs,
7 S-K-A-G-G-S.

8 Q Who was it against?

9 A It was against Hewlett Packard.

10 Q Okay.

11 A It was in Louisiana. I believe it was
12 in the state court of Louisiana. And the allegation
13 was that a woman got burned. Not that there was a
14 fire, but the batteries overheated and she got
15 burned.

16 Q So, tell me then what you did to
17 determine that authentication systems weren't
18 industry standard in the year that you investigated
19 that?

20 A I got vintage computers made by those
21 three companies that are in the paragraph. I got
22 batteries from Amazon, which I thought were very
23 inexpensive. So, they were likely to be non-OEM
24 batteries. I took the three laptops apart. I took
25 the original battery out. I put the substitute

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1 battery in. I started the laptop up and they worked
2 perfectly fine. They didn't give me a warning
3 message. And they worked with the non-OEM batteries.

4 Q Okay.

5 Now, when did you do this?

6 A Three years ago. Four years ago.
7 Something like that.

8 Q And did you obtain either from the
9 website of these manufacturers or any of the
10 documentation from these what you call vintage
11 laptops that indicated that the batteries that you
12 bought on Amazon were not authorized batteries to be
13 used in these computers?

14 MR. LEVITES: Objection.

15 You can answer.

16 A No, I didn't.

17 But as I said before, opposing expert
18 said oh, these three manufacturers have very serious
19 authentication; they are known to have
20 authentication.

21 In particular, it was well known in the
22 computer -- not industry, but consumer computer using
23 world that Apple was very serious about replacing
24 parts with non-Apple products. And so, we expected
25 that there were authentication schemes of some sort

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1 in those or really weren't really sure.

2 I don't know if that answers your
3 question.

4 Q No, it doesn't.

5 Because what I am trying to get at
6 is if I understand your testimony -- and again, I am
7 not trying to put words in your mouth.

8 But if I understand your testimony, you
9 obtained laptops from a certain era.

10 And I think in your report you
11 indicated that these were all made in 2010; is that
12 correct?

13 A I think the computer in question was
14 made in 2010. So, I had tried to get computers which
15 were available in 2010.

16 Q Okay.

17 And how did you --

18 A They might have been made in 2009, but
19 they were available for sale in 2010.

20 Q How did you determine that they were
21 available for sale in 2010?

22 A Well, I shopped on either on eBay or --
23 I think it was on eBay. And I believe that when I
24 got the laptops, I was able to tell when their
25 manufacturing date was. And I might have documented

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1 that as well.

2 Q Okay.

3 And you didn't document that in your
4 report in this case, right?

5 A I didn't document what in this?

6 Q The ages of each of the computers that
7 you bought --

8 A No, no. I didn't -- I am not -- okay.
9 Maybe I did it. Maybe I didn't do it. But clearly,
10 I did not provide a more detailed description of that
11 test process in my report that is in that paragraph
12 at the bottom of page 18.

13 Q I'm sorry.

14 You are saying that in the other report
15 you provided more detail in the case than you did
16 this?

17 A Yes, that's right. I videotaped the
18 process of replacing the battery. I am not sure if I
19 videotaped the replacement process. Well, I may have
20 done that, too. I documented the replacement process
21 and what the computers did after I put the other
22 battery in, the non-OEM battery into them. And I
23 also took pictures of the laptop. So, you would
24 probably see the manufacturing date of each of the
25 three laptops in my photographs.

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1 Now, as I am sitting here right now, I
2 can't tell you they were all exactly 2010, but that
3 was my intent when I did that. That's my
4 recollection right now how I did that.

5 Q Okay.

6 So, there is some record, either by
7 photograph or some notes or your prior report, that
8 will indicate what you determined to be the
9 manufacturing date of these three laptops, correct?

10 A Correct.

11 Q And so, you could provide that to us at
12 some later time?

13 A Okay. So, I am just making a note.

14 Q That's fine. I am glad you are doing
15 that.

16 A Because you requested a few things.
17 And if I don't write it down, I will forget. Okay.

18 Q And that's step one.

19 My next question is --

20 MR. LEVITES: And we will take your
21 requests under advisement.

22 Q Now, after you obtained these three
23 laptops from these three different manufacturers, you
24 said you also went on the internet, Amazon or some
25 other purchasing website, and you bought replacement

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1 batteries for them?

2 A Correct.

3 Q Okay.

4 And when you purchased those
5 replacement batteries, did you check with the
6 manufacturers of the laptops whether the replacement
7 batteries you purchased were authorized or not?

8 A No. I am not sure how I would do that.

9 Q Well, in other words, we know for
10 instance in this case that the battery specification
11 for this Pavilion series laptop was presumably
12 manufactured by HP -- by LG, right?

13 A Correct.

14 Q In other words, HP specced but they
15 approved LG as a vendor?

16 A I think it was an LG pack with LG
17 cells.

18 Q Right.

19 Okay.

20 So, that's what I am getting at.

21 Is that each laptop manufacturer had
22 certain authorized vendors to make their battery
23 packs, right?

24 A Correct.

25 Q So, how did you determine that the

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1 manufacturer of the battery pack that was -- that you
2 tested wasn't one of the authorized ones by the
3 manufacturer?

4 MR. LEVITES: Objection.

5 You can answer.

6 A As I recall what I did was I
7 photographed the battery packs that I purchased and I
8 made sure that the battery pack markings didn't have
9 the same indication as the computer markings. So,
10 like, what I mean is I got an Apple computer. I took
11 pictures of this non-OEM battery that didn't say
12 Apple anywhere on it.

13 Q So, that's how you determined it wasn't
14 an authorized battery?

15 A Correct.

16 Q Because it didn't have the markings of
17 the manufacturer on it?

18 A Correct.

19 Q The manufacturer of the laptop?

20 A Correct.

21 Q And that was true of the other two as
22 well?

23 A Correct.

24 Q Now, the battery packs for all of those
25 three computers that you purchased had fuel gauges,

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1 correct?

2 A I did not explore that issue. I didn't
3 take the battery packs apart. I didn't x-ray them.
4 I simply put them into the computer. You know, the
5 corresponding computer brand. And tested to see if
6 the computer worked. And the computer worked.

7 Q Okay.

8 So, you had no way of knowing whether
9 they were authorized by the manufacturer of the
10 laptop other than the fact that you didn't find any
11 indication on the outside of the battery pack saying
12 so?

13 A I think that's all I did.

14 Q Did you investigate whether the laptops
15 that you purchased had authentication capability
16 programmed into them?

17 MR. LEVITES: Objection.

18 You can answer.

19 A No, I didn't.

20 And part of the reason I didn't is
21 because part of the testing was done because an
22 opposing expert said "I think these three computer
23 companies have authentication." And so, we wanted to
24 prove him wrong. And, you know, you asked me some
25 questions about additional data, which I could have

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1 gotten which I didn't get, but part of the reason I
2 did it the way I did it was simply to show that that
3 opposing expert was incorrect about his assumption.
4 Because if there was any authentication, it certainly
5 would not have worked. It either wasn't there or it
6 was already bypassed.

7 Q I guess that's the issue.

8 So, do you have any way of knowing
9 whether the manufacturer used some sort of
10 authentication that was matched by the third-party
11 battery pack or whether they had no authentication at
12 all; like, telling the difference between those two?

13 MR. LEVITES: Objection.

14 A I am not -- all I --

15 No, I don't think I -- I don't think I
16 did anything of testing that would reveal that
17 information. And it was really pretty basic. That
18 the experiment was pretty basic. I put the
19 computers. I put the computers -- excuse me.

20 I put the batteries into the computers
21 and then the computers worked and didn't make any
22 indication that there was a non-OEM battery and
23 performed some fairly complicated functions, like,
24 playing a video or something like that. There was no
25 indication at all that the battery had been replaced.

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1 Q Okay.

2 And --

3 A So, I presumed either it didn't have
4 authentication or the authentication had been
5 bypassed in some fashion. But I didn't do further
6 investigating beyond that.

7 Q And there was a third possibility; was
8 that these were actually authorized battery packs and
9 they had the authentication system that the computer
10 was expecting?

11 That's a possibility, too, correct?

12 A I suppose that is a remote possibility
13 because I made every effort to obtain batteries which
14 I expected were not authorized by the computer
15 vendors.

16 Q And you did that by buying the cheapest
17 available battery pack?

18 A And looking at the labeling on the
19 battery. So, clearly, if I take a battery out of a
20 laptop and it says "Apple" on it and put something in
21 it that says nothing on the outside or it says
22 "Ninja" battery. Then I know it's not an Apple
23 battery. I mean, I don't have to take it apart to
24 know that. So, that's all I can tell you.

25 Q When it comes to the authentication

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1 system that was on or was not on these laptops, did
2 you make -- were you able to make any determination
3 whether it was an SHA-1 or some other type?

4 A I didn't do anything else to determine
5 what kind of authentication they had or didn't have.

6 Q Okay.

7 A I can't tell, you know, what type --
8 If it had authentication or what type
9 it was or anything.

10 Q So, to sum up what you did is you
11 bought three computers from three manufacturers, you
12 bought the cheapest replacement batteries, and you
13 just found out if it worked?

14 A Correct.

15 MR. LEVITES: Can we take another break
16 now?

17 MR. SCHWARZ: I just want to ask him.

18 Q You talked about the SHA-1. The
19 government saying not to use it anymore. And I just
20 wondered if on the break if you would take a look, I
21 believe the government said they should be phased out
22 by December 31, 2030. But you can verify that while
23 we are on the break, if you could.

24 A I think that there is a phase out alone
25 process by 2030. I think the announcements came out

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1 in something like 2011. And in 2017 or somewhere
2 around there, there was a challenge, what they call a
3 collision test done by some hackers. When they
4 discovered the collision, that's when the government
5 got concerned about it. I saw a 2030 date, but I
6 also saw an earlier date as well.

7 Q I will tell you that the NIST.GOV
8 website indicates that on December 15, 2022 NIST is
9 announcing SHA-1 should be phased out by December
10 31st of 2030.

11 And I would ask you that if you can
12 verify whether that's correct or incorrect on the
13 break.

14 MR. LEVITES: You want to take a longer
15 break so he can do that?

16 MR. SCHWARZ: I don't think it's going
17 to take him too long, but if you want to,
18 you want to take 15 minutes?

19 MR. LEVITES: Yeah, let's do that.

20 VIDEOGRAPHER: The time is 3:03.

21 We are going off the video record.

22 (Whereupon, a short break was taken)

23 VIDEOGRAPHER: The time is 3:17.

24 We are back on the video record.

25 Q Mr. Galler, were you able to check out

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1 exactly when that SHA-1 algorithm is to be phased
2 out?

3 A Yeah. It looks like we are both right.
4 So, apparently there is a date range. It's a
5 publication from this. This is National Institute of
6 Standards and Technology. It used to be called MBS.
7 Boulder, Colorado. And they published something in
8 January of 2011 which says you shouldn't use this
9 anymore.

10 And then, there were some timeframes
11 and indeed one of the timeframes is 2030. And as far
12 as I could tell, the way it looks is depending on
13 what you are doing, if you are doing something very
14 security sensitive, you should stop using it in 2011.
15 You should stop using it immediately when the 2011
16 thing was published.

17 And if you are designing new stuff in
18 2011, you shouldn't use SHA-1 anymore. You should
19 use SHA-2.

20 And if you are doing something that's
21 built into a big structure that requires a lot of
22 software changes to change from one to the other and
23 it's a low security, you can wait until 2030.

24 Q Okay.

25 Now, I got that website up now from

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1 2022. And it says:

2 "As today's increasingly powerful
3 computers are able to attack the algorithm.
4 NIST is announcing that SHA-1 should be
5 phased out by December 31st, 2030 in favor
6 of the more secure SHA-2 and SHA-3 groups
7 of algorithms."

8 Did you find something different than
9 that?

10 A I found the document that was published
11 in January of 2011. So, that's the world's notice,
12 the US world's notice, that there is a problem with
13 SHA-1.

14 Q Right.

15 Go ahead.

16 I am sorry.

17 A Clearly they are giving people until
18 2030 to get done doing the transition. But as soon
19 as this document was published, anybody who is
20 designing a new piece of equipment should go, oh,
21 well, clearly I shouldn't use SHA-1 anymore.

22 So, you know, that is when it was
23 officially called deprecating. Meaning, the
24 government had decided you shouldn't use it anymore.

25 Now, you know, if you want to build

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1 your stuff until 2030 and then -- I don't think that
2 makes any sense. If you have a big infrastructure
3 that's using SHA-1 and you are doing low security
4 stuff like, you know, selling movie tickets or
5 something like that. And you are selling movie
6 tickets online and you need to take a long time to
7 fix that, then that's fine. But basically they are
8 saying you shouldn't use it anymore. And that
9 document was published in January of 2011.

10 Q So, my question was different.

11 It indicates in this 2022 document that
12 the reason for this was because the very powerful
13 computers were able to attack the algorithm.
14 Meaning, that it took a powerful computer to beat the
15 SHA-1 system.

16 Do you have some understanding that it
17 didn't take a powerful computer; that anyone could
18 avoid that authentication process without a powerful
19 computer?

20 MR. LEVITES: Objection.

21 You can answer, Don.

22 A I am just reading the document.

23 Q Which one?

24 A The one from this.

25 Q No, but from what year?

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1 There is one from 2011 --

2 A I am reading the January 2011 document.

3 Q Okay.

4 MR. LEVITES: Steven, you want to put
5 up the '22 one?

6 MR. SCHWARZ: My question is really
7 about how it gets defeated. And I just
8 wondered if Mr. Galler thought that in a
9 counterfeit battery there would be a
10 powerful enough computer to defeat the
11 SHA-1 and how he knows that. That's my
12 question.

13 MR. LEVITES: Did you hear the
14 question, Don?

15 THE WITNESS: I did.

16 And I don't know if it's powerful
17 enough. And I understand your concern is
18 really is this really appropriate or is it
19 sort of a red herring. And I can't really
20 answer the question. All I can tell you is
21 that --

22 Well, no, I guess the question really
23 would be answered if we knew Texas
24 Instruments was offering chips that use
25 different --

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1 In other words, if two years later the
2 BQ 20Z90 was available and it used SHA-2, I
3 believe we have an answer to the problem.
4 That you should just switch. So, all I was
5 saying is that it looked like they didn't
6 like SHA-1 anymore. And if you are
7 designing new stuff around 2011 and you saw
8 that, you'll say maybe I should go to
9 SHA-2.

10 Q Okay.

11 A But I am not sure if it is a
12 requirement. I am just saying, you know, something
13 was going on in the industry relative to encryption.
14 And we are talking about encryption. So, you know,
15 you can argue about whether they really needed to do
16 it or not.

17 But what I am saying is if I were the
18 engineer and I was sitting down and I was at HP and I
19 was doing this, I would go to my boss and say, "Hey,
20 don't you think we should use this other chip because
21 it has SHA-2?"

22 Q If you take a look --

23 A I don't know --
24 I'm sorry.

25 I don't know if SHA-2 was available in,

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1 you know, any of the fuel gauges.

2 Q All right.

3 I think we got a little off my
4 question. So, let's go back to your report, which is
5 Exhibit 1, tab 1, and page 18 of your report.

6 A Okay.

7 Q On page 18 of your report you indicate
8 that the SHA-1 authentication system can be defeated
9 by counterfeiters.

10 See if you can find that.

11 A So, I think you are talking about what
12 looks like Section 2, second paragraph; is that
13 right?

14 Q I'm sorry.

15 A Can you please repeat the question?

16 MR. LEVITES: He is flipping to the
17 page, Don.

18 THE WITNESS: Oh, I am sorry.

19 MR. LEVITES: That's okay.

20 Q In Section 2 you say:

21 "If the query and response are
22 encrypted --"

23 I'm assuming you are talking about
24 SHA-1 encryption?

25 A Right.

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1 Q And:
2 " -- it is possible to defeat this
3 scheme. The eavesdropping engineer only
4 needs to know when in the startup sequence
5 the communication codes occur. The
6 question and answer do not need to be
7 deciphered. Once the request and response
8 are captured. The BMU can be programmed to
9 recognize the request and respond with the
10 encrypted response."

11 That's the paragraph I am talking
12 about.

13 A Okay.

14 Q So, is it your --
15 I am just going to ask you a question
16 about this.

17 Are you saying that the SHA-1 doesn't
18 produce a unique number each time that has to be
19 matched by the SHA-1 algorithm in the battery pack,
20 but that an engineer could listen to it once and
21 figure it out and program the counterfeit battery
22 pack to always come up with the right number?

23 MR. LEVITES: Objection.

24 You can answer, Don.

25 A Yeah. I think I was thinking that the

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1 query and the response when they first occurred would
2 always be the same.

3 Q But in SHA-1, that's not true, right?

4 A No, no. Even if they are --

5 Doesn't matter what they are encrypted
6 with. The question is does the encryption change.
7 Does something change each time.

8 Q What SHA-1 algorithm does is generates
9 a unique number each time.

10 A Do you understand that?

11 Q Yes, I understand that. But --

12 A Okay.

13 Q But it's based on something.

14 A Based on --

15 A No, no, no. That's not --
16 I understand that. What I am saying is
17 SHA-1 doesn't just generate a random number. That's
18 not what it does. What it does is you give it a key,
19 like, a four bit number, a three digit number, right?
20 You give it a three digit number and it gives you a
21 160 bit number. When you give the same 3 bit digit
22 number, you get the same thing out. You got 160 bits
23 but you got the same 160 bits. And what I was
24 saying --

25 A And maybe this is wrong on my part, but

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1 what I was saying was that if that transmission query
2 and response are the same 160 bit when you first turn
3 the computer on, the eavesdropper doesn't have to
4 know what they come from. All he has to know oh,
5 they are the same every time. If it knows they are
6 the same every time, you can program them into the
7 fuel gauge chip and tell the fuel gauge chip that
8 when you see this -- when you see X, a really long
9 160 long bit thing, when you see that pattern, spit
10 back this other pattern.

11 So, that's not necessarily correct in
12 this particular example. But I guess what I am
13 saying is that the people doing the eavesdropping
14 will go to no end to try to figure out what is going
15 on. As long as they can eavesdrop, they have a
16 chance of bypassing the authentication; overriding
17 the authentication.

18 Q What is the basis of your understanding
19 that an SHA-1 algorithm authentication system and a
20 peripheral can be defeated in the way that you just
21 described it?

22 In other words, did you read an article
23 about that?

24 Have you done it yourself?
25 Have you done research to understand

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1 how that would be done and duplicated it?

2 Tell me how you know that.

3 A Oh, okay. I haven't done much research
4 and I haven't done any experiments. I read an
5 article on hacking, and there were many of them. And
6 they do things, like, looking at the fuel gauge chip,
7 looking at something else in the computer, and
8 actually getting to the point where you change the
9 programming in both of those things. The hackers
10 that do this go to computer conferences and they make
11 presentations. So, I have a bunch of presentations
12 from a couple of people that were doing stuff like
13 that and it looked very sophisticated to me, and
14 enough to figure out how to bypass this
15 authentication.

16 I can't tell you as I am sitting here
17 right now. I guarantee it will work. All I am
18 saying is that the level of sophistication of the
19 hackers was very high. And so, it seemed to me that
20 if they wanted to, they would be able to bypass the
21 authentication.

22 Q I am not trying to put words in your
23 mouth, I am trying to understand your answer.

24 So, you have been to conferences --

25 A No. I just read about the conferences

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1 online.

2 Q Okay.

3 You read about the conferences online
4 of hackers specifically talking about defeating the
5 SHA-1 algorithm authentication system in a laptop
6 computer?

7 A Not necessarily SHA-1, but encryption
8 was involved that they had to decipher.

9 Q Okay.

10 So, let's talk about SHA-1 then.

11 What is your basis of your opinion that
12 in an authentication system based on SHA-1 in a
13 laptop and battery pack that these can be easily
14 defeated in the manner that you described in your
15 report?

16 What is your basis for that?

17 A Okay. Well, I wouldn't say they could
18 easily be defeated; but more work is involved. And
19 even your expert, Dr. Martin, says "Yes, some
20 authentication schemes can be defeated."

21 Q I am sorry.

22 I am not asking about Dr. Martin.

23 I am asking about your opinion that you
24 wrote in your report that SHA-1 can be defeated in
25 this manner on page 18.

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1 I want to know how you came to that
2 conclusion and what it is based on?

3 A If. If. I said if the query and
4 response are encrypted, if they are the same when you
5 first --

6 Q But an SHA-1 is not the same?

7 A No, no, no, no. You are saying --
8 I'm sorry.

9 Finish your statement.

10 Q An SHA-1 generates a new number each
11 time the query is made, correct?

12 A Unclear.

13 Q You don't know that?

14 A No, it's unclear. If the key -- it's
15 not about --

16 They talk about a key, which is the
17 decoding of the manufacturer's ID. If the key is the
18 same and you put it into SHA-1, you get a number that
19 comes out. And that number is the same if you put
20 the same key into SHA-1. It doesn't just generate a
21 random number every single time.

22 Q Okay.

23 So, what is your --

24 A So, my presumption was that the key was
25 the same. And then, the idea is that it sends 160

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1 bits to the fuel gauge chip and the fuel gauge chip
2 sends something back. And the laptop goes oh, I sent
3 160 bits to the fuel gauge chip and I got something
4 160 bits back from the fuel gauge chip, and those two
5 things are the same. So, now I checked that the fuel
6 gauge chip is authentic.

7 Q Okay.

8 A I made an assumption there. I want to
9 be clear I made an assumption there. If the keys
10 keep changing, this gets a lot harder.

11 Q So, that's the question.

12 What is your understanding of how
13 accessible the key would be to a hacker in trying to
14 do this type of --

15 In other words, you are saying, if I
16 understand it, that if the counterfeiter knew the key
17 they could put the key into the battery pack. And if
18 it was the same key as the laptop, then they would
19 generate the same numbers.

20 Is that correct?

21 A Correct. That's what I am saying.

22 Q Okay.

23 Now, what evidence do you have that any
24 counterfeit battery manufacturer has ever
25 accomplished that?

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1 A I don't have any evidence that they
2 accomplished that. What I am saying is there is a
3 level of technology that's required and it may be
4 possible to do it that way.

5 Q So, it may be possible. You are not
6 saying it is possible?

7 A That's correct.

8 I am just saying here what is going on.
9 And the hackers --

10 If there is something more complicated,
11 hackers have enormous capabilities to sort of reverse
12 engineer what was going on or what is going on
13 communicated between the two devices; the computer
14 and the battery pack. So, it's possible that --

15 You know, it seems to me that the level
16 of technology of the hackers keeps advancing as the
17 level of technology of the encryption does.

18 Q But you cannot say with reasonable
19 certainty that that's actually been accomplished in
20 SHA-1 systems in a laptop and battery pack?

21 A No. That's right. In fact, we are
22 talking about this process which we know is not used
23 by anybody. In other words, these authentication
24 schemes that we are talking about in battery packs
25 for laptop computers we know is not A, it's not

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1 required and B, we don't know if anybody is actually
2 using it.

3 Q Now, you said three difference things
4 there.

5 You said we know that no one is using
6 it or we don't know that someone is using it.

7 Which is it?

8 A We know that there is no standard
9 requiring the use of it. I misspoke. There is no
10 standard requiring the use of it. And we don't know
11 if any manufacturer is actually using it.

12 Q You also --

13 Go ahead.

14 I am sorry.

15 A No, I said I was done.

16 Q So, you are also saying that you cannot
17 say with reasonable certainty that no one is using
18 the SHA-1 algorithm that is available on all of these
19 fuel gauges from TI?

20 MR. LEVITES: Objection.

21 You can answer.

22 A I don't know who is using it or whether
23 they are or not.

24 Q Okay.

25 Thank you.

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1 A There is no requirement for the user to
2 use any of it.

3 Q And are you saying that there is some
4 agency that sets requirements for what authentication
5 systems need to be used?

6 A In this context of laptop batteries
7 communicating with the laptops?

8 Q Yeah.

9 A No, I am not aware of any.

10 Q You said that they are not required.

11 So, I was assuming --

12 A If they were required, HP would know
13 about them. Dr. Martin would know about them. We
14 will be having a different discussion.

15 Q My question is what is the body or
16 entity that sets requirements for authentication for
17 anything else for laptops other than UL?

18 A I am not sure there is any --

19 So, UL's charter is fire safety. And
20 so, if --

21 Mainly, fire safety. Fire and electric
22 shock safety. If they thought that these things were
23 causing a fire all the time, they would make it part
24 of a UL standard. Also, there is the IEEE, the
25 Institute of Electrical and Electronic Engineers.

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1 They publish standards as well.

2 But there is no standard from either of
3 those organizations that says if you have a
4 lithium-ion battery pack, you got to do this. You
5 got to put an authentication system in. Power tools.
6 I am not aware of any. I don't think anyone else is
7 aware of any.

8 Q So --

9 A Go ahead.

10 Q Is it your understanding that if a
11 manufacturer is aware of a hazard that can be
12 corrected or prevented, that if there is no UL or the
13 other organization requirement, that the manufacturer
14 shouldn't make that change?

15 MR. LEVITES: Objection.

16 You can answer.

17 A I didn't say that. I just said they
18 weren't --

19 If they were required, HP and the other
20 manufacturers would be using them.

21 Q So, even though HP knew from you and
22 from Mr. Atkinson and from Mr. PiPho that fires were
23 occurring because of these counterfeit batteries,
24 it's your opinion that they are not required to do
25 anything until some agency or some entity tells them

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1 to?

2 MR. LEVITES: Objection.

3 A No, I don't think I will make that
4 representation. I just mean that there was no
5 requirement.

6 Q Okay.

7 A Ethically, should they have been doing
8 it? Morally should they have been doing it? Well,
9 that's a different matter. You are raising that and
10 I think you are right to raise that. I am just
11 saying there is no --there is no UL certification,
12 for example. There is no requirement to do that.

13 And I think the reason I am giving it
14 some importance is because that's their job. When
15 something becomes really, really dangerous, they go,
16 this is really dangerous, we got to fix this, we are
17 going to fix this by changing a standard somewhere.
18 And apparently --

19 And I know it causes fires every once
20 in a while. But apparently UL has not produced a
21 standard.

22 Q But when HP knows that something is
23 very really, really dangerous, aren't they required
24 to make a change under the law?

25 MR. LEVITES: Objection.

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1 Steve --

2 A I wouldn't know that.

3 Q Now, when did HP first institute any
4 authentication system in its laptops?

5 Are you aware of that?

6 MR. LEVITES: Objection.

7 You can answer.

8 A In -- at least.

9 MR. LEVITES: You want to point him to
10 that testimony, Steve?

11 Q I can show you the testimony if you
12 want.

13 MR. LEVITES: Are you referring to your
14 report, Don?

15 THE WITNESS: I was trying to answer
16 the question and maybe I was not properly
17 prepared to answer the question.

18 So, let me just make sure I am chasing
19 the right one.

20 I thought I saw a document in the
21 notebook, your notebook that you provided,
22 where there was an HP employee. I think it
23 was probably Lee Atkinson saying, "Ah, here
24 is what pin 6 does." So, pin --

25 Q I will represent to you, and I can show

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1 you the testimony. It's page 105 to 106.

2 Mr. Atkinson says that:

3 "The first authentication programming
4 for HP in any laptop occurred in 2019 when
5 they instituted a system where the user
6 would get a warning on the screen."

7 Do you recall that?

8 A No, I don't recall that. I believe
9 you. I believe you. I don't see it. What I am
10 saying is --

11 MR. LEVITES: Hold on. Wait for the
12 next question.

13 THE WITNESS: Sorry.

14 Maybe I should look at that.

15 Q Okay.

16 Let me find it.

17 I am going to share the screen with
18 you. I want to make this bigger for you.

19 A Oh, thank you.

20 Q Oh, here it is.

21 Page 105, line 6.

22 With my cursor it says:

23 "When did the pop-up that you described
24 meaning a message that the computer
25 operator would see on the screen about the

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1 potential that the battery pack that was in
2 the computer was an unauthorized HP device?
3 When did that pop up first appear or first
4 become available on a newly manufactured HP
5 laptop computer?"

6 And Mr. Atkinson answered:

7 "In 2019."

8 And then I questioned him:

9 "So, prior to that was there any
10 message that an operator prior to units
11 manufactured prior to 2019 was there any
12 message that a user of an HP laptop, a
13 Pavilion laptop computer, would receive in
14 the event that an unauthorized battery pack
15 tracking safety functions was installed in
16 the computer?"

17 And then there is an objection.

18 And then on page 106, Mr. Atkinson
19 answers:

20 "Before that, there was no message when
21 a non HP battery was when the battery
22 didn't identify as HP was installed."

23 Does that refresh your recollection?

24 A It informs my recollection. I am not
25 sure I read that before.

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1 Q Okay.

2 A I see the dates. I see what you are
3 saying.

4 Q And that deposition date was August 2,
5 2023.

6 And you didn't find any information
7 contrary to what Mr. Atkinson said, that any kind of
8 authentication was installed by HP in laptops prior
9 to 2019, have you?

10 MR. LEVITES: Objection.

11 That's not what it said.

12 A Not in terms of a, you know,
13 authentication scheme like that. But you realize
14 that the mechanical form, the electrical format of
15 the connector, what the connector pins mean, all of
16 that can be construed as an authentication scheme
17 that the counterfeiter had to replicate. So,
18 everything is being copied by a counterfeiter. And
19 part of that is essentially authentication but it's
20 not the same in the context we discussed.

21 Q So, you are saying that the form of the
22 battery pack and the connections are something that
23 in some sense prevent using the wrong battery for a
24 computer but that's also easily reverse engineered?

25 A Correct. Correct.

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1 All we are doing is making things
2 step-by-step harder for people to reverse engineer,
3 and they always do it.

4 Q But we can't --

5 Again, going back to the SHA-1, you
6 can't say that any counterfeiter has employed a
7 system to defeat an SHA-1 authentication system, that
8 you are aware of?

9 A I'm not aware of any. No.

10 Q Okay.

11 Now, you were able to evaluate the
12 battery management system circuit board for the
13 subject laptop when you went to FRT, correct?

14 A I saw it. I have some knowledge of it.
15 But I am not sure what you mean by "evaluate."
16 I didn't do any electrical tests on it, if that's
17 what you mean.

18 Q Did you visually inspect it?

19 A Yes, I did.

20 Q And did you determine whether all the
21 fuel gauge pins on the fuel gauge that was installed
22 on that motherboard were actually connected to the
23 circuit board such that the safety features that were
24 intended for the authorized battery pack were
25 actually instituted on that counterfeit laptop

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1 battery?

2 MR. LEVITES: Objection.

3 You can answer, Don.

4 MR. SCHWARZ: That was a terrible
5 question. Let me start again.

6
7 Q The battery management system on the
8 battery pack that was in the computer at the time of
9 the fire had a fuel gauge, correct?

10 A Correct.

11 Q And did you research that fuel gauge to
12 determine what its capabilities were?

13 A Yes. Well, I got the data sheet. Yes,
14 I did. I did.

15 Q Okay.

16 So, let's take a look at tab 12 in the
17 notebook then. This has been marked as Exhibit 18.

18 A Now, this is the chip that was on the
19 board in question.

20 Q So, the board in question had a Texas
21 Instruments fuel gauge chip, but it wasn't one of the
22 ones that was specified in the HP specification?

23 A I think that that's correct. Yes.

24 Q Okay.

25 A You had this BQ 2060A.

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1 Q Right.

2 And this Exhibit 18 is the --
3 specification for that particular fuel gauge to the
4 ones we've looked at previously?

5 A Correct.

6 Q In other words, it provides the
7 functionality of this particular Texas Instrument
8 fuel gauge?

9 A Yes.

10 Q Okay.

11 So, if you turn to the second page of
12 Exhibit 18, there is a chart that is entitled, "Pin
13 Descriptions."

14 A 18. This is tab 12. Wait. Wait. I
15 am sorry.

16 Q Exhibit 18.

17 A Tab 12.

18 And what did you say? Page 18?

19 Q Page 2.

20 A Tab 12. Page 2.

21 Yeah, I see. Okay.

22 Q And this, for the record, has been
23 marked as Exhibit 18 but don't let that confuse you.

24 A Okay.

25 Q So, this chart then describes what the

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1 pins on the fuel gauge are intended to provide. The
2 functionality they are intended to provide.

3 A Correct.

4 Q Okay.

5 A I interpreted it as a question.

6 Q Okay.

7 So, pin number 16 is entitled CFC and
8 that is actually the charge that is similar to what
9 we talked about, the switch that we talked about,
10 correct?

11 A Correct.

12 Q And so, in the other such cases we
13 looked at, the charge FET and we looked at the
14 specifications that HP has, the charge FET is a
15 switch that can be turned off when certain parameters
16 are met. For instance, voltage is too high or the
17 cell imbalance is improper or the temperature is too
18 high, correct?

19 A Correct.

20 Q So, this device --

21 This fuel gauge that was on the -- in
22 the battery pack management system for the battery
23 that was in the computer at the time of the fire had
24 the capacity to have a charge FET that could be
25 turned on and off under certain circumstances?

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1 MR. LEVITES: Objection.

2 You can answer.

3 Q That's what this document says?

4 A Could you repeat the question?

5 Q Yeah.

6 The BQ 2060A fuel gauge that was on the
7 battery pack at the time of the fire had the capacity
8 to use a charge FET to turn on and off the charger?

9 MR. LEVITES: Objection.

10 You can answer.

11 A Yes, it had the capacity. The reason I
12 am saying it that way is because as I am sitting
13 here, I can see the chip has the capability to do
14 that, but I don't really know that it was connected
15 to the charge FET. So, I presume it was. But, you
16 know, you asked me about the BMU's capability which
17 is different than the chip capability.

18 Q Well, exactly. So, that was going to
19 be my next question.

20 In Dr. Martin's report, based upon his
21 inspection, he provided information in his report
22 saying that it was not connected to the pin 16, the
23 pin circuit board in the battery management system in
24 the computer at the time of the fire. That the C-FET
25 pin 16 was not connected to the circuit board.

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1 My question to you is do you disagree
2 with that?

3 MR. LEVITES: Objection.

4 You can answer.

5 A I don't have any reason to disagree
6 with it. I am just a little surprised. But I am
7 generally aware that the Battery Management Unit
8 didn't have what you would consider the same
9 capabilities as the spec -- the HP spec required, you
10 know what I mean. In other words, I know it didn't
11 have some functions. That's just not one of the
12 functions I knew it didn't have. There were other
13 ones that I knew it didn't have.

14 Q Which ones did you know it didn't have?

15 A Well, as far as I could tell --

16 Well, so the BMU, the Battery
17 Management Unit circuit board, had two solder pads.
18 Meaning, circular holes with some solder around there
19 where wires would go. It only had two. It looked
20 like it only had two to connect to the battery pack.
21 But the battery pack had six cells. So, that means
22 that it should have had really --

23 It had three pairs of two. So, there
24 looks like three cells. So, there should have been
25 four wires so that the fuel gauge chip could measure

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1 the battery voltage of the middle pair, you know what
2 I mean? In other words, if there is three pairs,
3 three sets of cells, you have the high end, then you
4 have the high end of the middle battery, and then you
5 have the low end of the middle battery and then you
6 have the low end of the pack. So, that's four
7 connections. So, there should have been four
8 connections. It didn't have four connections. And
9 as far as I could tell, it only had the two. So, I
10 know it didn't --

11 So, that means that down at the bottom
12 of the table where it says VCELL1 to VCELL4, not all
13 of those leads were connected. Because it
14 couldn't --

15 Q Okay.

16 A It couldn't --

17 I'm sorry.

18 Q You go.

19 A It couldn't measure the intermediate
20 cell pair.

21 Q And that means it couldn't monitor cell
22 balance?

23 A Correct.

24 Well, there is two things. It couldn't
25 monitor the cell voltage and it couldn't do cell

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1 balancing. Cell balancing is the process where it
2 determines that one of the cell pairs is a little bit
3 low in voltage. And to equal them all out, it does
4 help to make the current be a little higher in that
5 cell so that they all eventually wind up being the
6 same. So, in addition to not being able to monitor,
7 it can't be doing anything about it if they are out
8 of balance.

9 Q Pin number 19 of this fuel gauge that
10 was on the battery pack that was in the computer at
11 the time of the fire is the pin that's supposed to be
12 connected to the thermistor that's going to measure
13 temperature and monitor temperature.

14 Did somebody say something?

15 A Somebody said something but I don't
16 know who it was.

17 MR. LEVITES: I just got an alert. I
18 apologize.

19 MR. SCHWARZ: No worries.

20 MR. LEVITES: Just the time that it's
21 4:00.

22 MR. SCHWARZ: Okay.

23 Q My question is did you investigate the
24 current circuit board and fuel gauge on that battery
25 pack to determine whether that pin was connected to

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1 the pin circuit board so that the temperature
2 monitoring function was available?

3 A I had --

4 I didn't make any measurements from the
5 looks of it. Well, let me put it this way. As far
6 as I could see, there was no thermistor. In order
7 for the thermistor to work properly, there would have
8 been a pair of leads coming off the circuit board
9 going to, like, strapped one of the batteries, like,
10 with tape so to measure the battery temperature.
11 There was no such thermistor. So, that suggests that
12 there was nothing connected to pin 19.

13 Q Okay.

14 A So, without --

15 In other words, without that
16 thermistor, it's not required for me to figure out
17 whether it's connected or not because it's not there.
18 So, they couldn't measure anything. Now, whether
19 they faked it out in some fashion, meaning, did they
20 put a resistor somewhere on the board or was it
21 really measuring a temperature that looked like it
22 was measuring, I have no idea. I might have
23 suggested that at one point. But there was
24 definitely no thermistor connected to the batteries.

25 Q Okay.

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1 And that's the important point because
2 that means that the protection of preventing thermal
3 runaway was not on this battery pack?

4 A Correct.

5 Q And that means that this battery pack
6 if it overheated had no safety system to prevent it
7 from going into thermal runaway?

8 A That is correct.

9 And if it was charging -- if it was
10 charging -- so, if it was just --

11 If it was charging and the temperature
12 got too high, then it would stop charging. The
13 system would stop charging. If it went into
14 thermal -- if it went into thermal runaway induced by
15 an exterior heat source, it really couldn't remove
16 that exterior heat source.

17 But at some point as the temperature in
18 the battery got too high, the BMU would stop the
19 charging or the laptop would try to stop the
20 charging. That wouldn't necessarily stop it from
21 getting impacted by external heat, but it may slow
22 that process down.

23 Q Let me unpack that one.

24 I think what you are saying -- I am not
25 trying to put words in your mouth.

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1 I think what you are saying is that
2 without the thermistor if it was charging, which it
3 was at the time, then if the temperature got above 46
4 degrees Celsius, there would be nothing to tell the
5 computer to stop charging?

6 A Correct.

7 Q Okay.

8 And as a result, if that happened, then
9 the temperature could continue to rise to a point
10 where it could become self-sustaining and turn into
11 thermal runaway?

12 A That could be. That could be.

13 Q Okay.

14 And the same thing with regard to the
15 cell balance mechanism.

16 Without the cell balance mechanism,
17 there was increased potential for one cell to be
18 overcharged, which could also lead to the
19 irreversible thermal runaway reaction, correct?

20 A I believe that's correct.

21 Meaning, that overcharging could result
22 in thermal runaway.

23 Q And without the charge that there would
24 be no mechanism for the fuel gauge to actually
25 discontinue charging or to blow the fuse if the

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1 charge FET wasn't activated?

2 A Well, first of all, there was no fuse.
3 I mean, it's kind of a special part. It has a shape
4 that I would recognize. I didn't see a fuse on that
5 board at all. There was no fuse. And so, the first
6 part of your question I didn't --

7 So, you are saying the charge they
8 weren't there on the board at all?

9 Q Well, what we know from looking at the
10 fuel gauge is that there was no connection to the pin
11 on the fuel gauge that would control the charge.

12 So, without a connection, then, the
13 charge FET would not be activated by the fuel gauge
14 because there is no connection?

15 A Well, are you suggesting that that
16 means that --

17 I mean, the batteries had to be able
18 to --

19 If there was a charge FET connected
20 between the batteries and the incoming power from the
21 laptop, the charge FET has to be turned on in order
22 for charging to take place.

23 Are you saying there was no charge FET
24 or it was bypassed or what?

25 Q I'm sorry. I misspoke. I apologize.

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1 What I meant to say is without the fuel
2 gauge controller that could turn off the charge FET
3 then the charge FET will stay in an on position all
4 the time?

5 A So, you think it was wired --

6 I printed a few things out, but I am
7 not sure I printed out the pictures.

8 MR. LEVITES: Your pictures of the
9 board is at Figure 21, page 28, the
10 close-up of the board.

11 THE WITNESS: Oh, okay. In my report,
12 you are saying?

13 MR. LEVITES: Correct. Figure 18
14 before cleaning it, I think.

15 THE WITNESS: I got 18.

16 MR. LEVITES: There is one other where
17 you talk about the solder hose, but.

18 THE WITNESS: Yeah. Well, I guess, it
19 looks like --

20 Q Actually, take a look at --

21 A There is no charge FET. There is no
22 C-FET. There is no --

23 Oh, so I think what they did is they
24 had the battery connector connected directly to the
25 batteries. They had no control for overcharging or

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1 discharging. It was just always connected.

2 Q And as a result of that, then, there
3 was a further risk --

4 A Correct.

5 Q -- that this could overheat and go into
6 thermal runaway?

7 A Correct.

8 Plenty of opportunities for --

9 Q So, just to sum up this area, this
10 particular counterfeit battery pack lacked the safety
11 features that would prevent in the charging mode the
12 battery itself to go into thermal runaway?

13 MR. LEVITES: Objection.

14 You can answer.

15 A I think that's correct.

16 Q And you understand that the laptop was
17 plugged in the charging mode at the time of the fire,
18 correct?

19 MR. LEVITES: Objection.

20 You can answer.

21 A Well, when you say "charging mode,"
22 yeah, it was plugged in. And therefore other than
23 any indicators that it was not being charged, it
24 appeared to be charging correctly. That was my
25 understanding.

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1 Q Okay.

2 Now, what is your understanding of how
3 many of the six cells actually went into thermal
4 runaway?

5 A Well, I think that four of them were
6 damaged and I think there is a pair that was not
7 damaged. And I can't --

8 But they didn't go into thermal runaway
9 and sort of expel their contents or burst open.

10 Q Okay.

11 So, two of the cells exploded and burst
12 open, correct?

13 A Correct.

14 Q And two of the cells ejected all of
15 their contents that were found empty in other parts
16 of the room?

17 A I think that's correct.

18 Q And two of the cells were ejected but
19 did not lose their vent caps and did not eject their
20 internal material?

21 A I think that's correct.

22 Q And those last two that didn't blow
23 their vent tops and eject their internal material
24 would not have gone into thermal runaway to be found
25 in that condition, correct?

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1 MR. LEVITES: Objection.

2 You can answer, Don.

3 A Well, I am not sure you can conclude
4 that they didn't go into thermal runaway. They
5 didn't go into thermal runaway and have a
6 catastrophic destruction of the cells. But there are
7 a couple of safety devices in each 18650. In the
8 top, there is a venting mechanism. So, when the
9 battery goes into thermal runaway and starts to
10 produce gas and pressure, that vent is supposed to
11 open and allow pressurized gas out of the cell
12 avoiding explosion of the cell. So, that might have
13 happened.

14 Q Okay.

15 So --

16 A Then the cell contents would still be
17 in the cell.

18 Q And did you inspect those cells when
19 you went to FRT to determine whether you thought that
20 those two cells had thermal runaway?

21 A I did not. I just took pictures of the
22 ends of them. I think that I have x-rays. But the
23 cell condition --

24 Since I knew the four went into thermal
25 runaway pretty seriously, I wasn't too concerned

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1 about what the other two did.

2 Q And --

3 A Go ahead.

4 Q Based upon your analysis and what we
5 just discussed, then, you would agree that the six
6 cells showed different levels of damage?

7 A Correct.

8 Q They didn't all --

9 Two exploded, two ejected all of their
10 contents and two continued to have their contents?

11 A That's correct.

12 Q Now, in a thermal runaway situation in
13 a battery pack with multiple cells, it's not
14 necessary for all the cells to go into thermal
15 runaway simultaneously, correct?

16 A Yes, it's correct.

17 Q So, in other words, there can be a --

18 Let's just say there is no cell
19 balancing function and one of the cells gets
20 overcharged and goes into thermal runaway.

21 That's going to create a great deal of
22 heat, correct?

23 A Correct.

24 Q And that heat can be transferred by
25 induction to the other cells that can force them into

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1 thermal runaway?

2 A That's also correct.

3 Q So, a thermal runaway reaction in a
4 battery pack with six cells or at least four going
5 into thermal runaway, if the initiating event
6 happened in one cell, you are going to have a spread
7 over time to the other cells?

8 It's not going to happen all at once,
9 correct?

10 MR. LEVITES: Objection.

11 You can answer.

12 A I don't want to make the conclusion
13 that that's going to happen, you know, or how fast
14 it's going to happen because I just don't have that
15 much experience.

16 I am just saying I agree with you on
17 your prior statement. Heat from one cell that goes
18 into thermal runaway can heat up the other cells and
19 induce thermal runaway in the other cells. But
20 whether that takes place instantly or over some
21 period of time, I am just not -- I am not battery
22 experienced enough to tell you how that works.

23 Q The damage to the laptop, though, that
24 we looked at both from above and from below in the
25 battery compartment wasn't uniform, correct?

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1 It was worse on one side than it was on
2 the other?

3 A Correct.

4 Q And that would also be indicative of
5 the sides that had the worst damage the cells going
6 into thermal runaway and the sides with the least
7 damage being the least damaged cells?

8 MR. LEVITES: Objection.

9 A Now, I don't --

10 I am not comfortable characterizing it
11 in any particular way that you --

12 My experience is that the battery does
13 all these odd combinations of things. And I don't
14 study the, you know, patterns of what is melted and
15 how the cells get out and that sort of thing very
16 often. So, I can't tell you, yes, that's consistent
17 with some process sequence.

18 Q Are you familiar with anything that you
19 read or any research that you've done that a sequence
20 or thermal runaway from one cell inducing another
21 cell is something that has been reported even if you
22 haven't seen it?

23 A No. I read -- I read that thermal
24 runaway in one cell, in a multi-cell system can
25 induce thermal runaway in the other ones.

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1 I thought what your question was, was
2 it consistent with the way it occurred, specifically
3 with the way it occurred in this case, and I couldn't
4 answer that question.

5 So, maybe you should read the question
6 back, the prior question back.

7 Q I will just keep asking.

8 I am not asking if this happened in
9 this case.

10 I am asking if this is something that
11 you read about or you've seen where one cell is --

12 The event occurs where thermal runaway
13 starts but then it spreads to the other cells.

14 Have you seen that in your
15 investigations or in your reading?

16 A I read about it.

17 Q Okay.

18 A And I heard through investigators
19 saying they know that that happens.

20 Q And you would agree with me that the
21 first cell has to get to a certain temperature before
22 it's going to be able to spread that heat to the
23 other cells for them to reach the requisite
24 temperature to go into thermal runaway?

25 MR. LEVITES: Objection.

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1 A I just --

2 Because of the way you ask questions, I
3 am hesitant to answer your question as it was formed.4 I don't want to imply that there is a
5 specific temperature that the cells have to get to in
6 order to induce thermal runaway in the other cell.7 Because I think it depends on the condition of the
8 adjacent cells as well as the temperatures.

9 Q Okay.

10 So, tell me about your basis of
11 knowledge of the difference in temperatures to induce
12 thermal runaway.13 In other words, what is it that you are
14 relying on to say that the temperature for thermal
15 runaway in one cell can be different than another
16 cell?17 A Well, what I read is that the thermal
18 runaway can incorporate a failure of the separator.
19 The separator is the insulating material. So, the
20 jelly roll, the thing that is inside the 18650, has
21 kind of, like, a positive metal and a negative metal.
22 So, one is kind of copper looking and one is
23 different looking and there is a plastic material in
24 between them that has little pores in it. Because
25 the pores have to be there to let the ions go back

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1 and forth.

2 And if there is a --

3 If the separator, the insulating
4 material, if that's got some kind of a defect in it,
5 and it is not observed really early on, then I would
6 imagine that when thermal runaway occurs in an
7 adjacent cell, that type of cell with that latent
8 defect in it that hasn't exhibited itself yet, is
9 going to be impacted early on because it's closer to
10 a failure that shorts the two layers out, the plus
11 and minus layers out, than a normal healthy cell.

12 So, what I am saying is if you got sort
13 of a sick cell next to a really sick cell, those two
14 will react differently than if you had a healthy cell
15 next to a sick cell.

16 Q What is the --

17 Again, you said "I would imagine that
18 would occur."

19 Have you actually done any research or
20 read any papers that had studied that process to
21 determine the difference in the thermal runaway
22 temperature required?

23 A No. No. What I am saying is I read
24 something that said, okay, here is what can be part
25 of a problem that produces thermal runaway. And it

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1 could be things like a separator that is a little
2 thin. A separator that makes --

3 When it heats up a little bit, it
4 bridges between the plus and minus foils. Another
5 problem is you have a little piece of metal that is
6 stuck to the separator from production. You know,
7 junk got in the production process. And so, it's not
8 shorting it out, but once the thing begins to get to
9 a certain temperature, that piece of metal shorts the
10 plus and minus and so there could be thermal runaway
11 from that process. It outlined a couple of errors in
12 the production; problems that the cells could have.
13 And it said --

14 So, all I am saying is I haven't read,
15 oh, that means it will start thermal runaway at this
16 temperature or anything like that. I am saying there
17 are different problems. Different problems probably
18 aviate themselves in different ways.

19 Q Right.

20 So, getting back to your prior
21 testimony.

22 You have no knowledge at all as to what
23 temperatures are required in any of these different
24 types of defects to produce thermal runaway, correct?

25 MR. LEVITES: Objection.

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1 Q Other than the 130 degrees.

2 A I think you are -- I think you are
3 doing it again. I didn't answer your question so you
4 are saying I have no knowledge at all. I just
5 answered my knowledge question. Then you said, "It
6 doesn't exist. You have no knowledge at all." So,
7 please stop doing that.

8 Q Okay.

9 I apologize if you --

10 A I --

11 Q Tell me what temperatures are required
12 to induce thermal runways in 18650 cells?

13 I thought you told me you didn't know.

14 MR. LEVITES: Objection.

15 A I know what the standard test is. And
16 the temperatures are above 130 degrees C on cells
17 that have been tested to meet the UL requirements,
18 which means they got to be tested to 130 degrees for,
19 say, ten minutes and not do anything and not fail.
20 So, at some temperature above 130 C, they could --

21 You know, a normal cell that's been UL
22 listed, that is in a legitimate pack, if it gets over
23 130 C, that's a temperature above which they could go
24 into thermal runaway. I don't know any more than
25 that about exactly what temperature it happens.

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1 MR. LEVITES: Let's take a break.

2 (Whereupon, a discussion was held off
3 the record)

4 VIDEOGRAPHER: The time is 4:22.

5 We are going off the video record.

6 (Whereupon, a short break was taken)

7 VIDEOGRAPHER: The time is 4:34.

8 We are back on the video record.

9 Q Now, Mr. Galler, I think through the
10 testimony this morning, we've -- and this afternoon,
11 we've established your opinion that at least four of
12 the cells went into thermal runaway in this battery
13 pack, correct?

14 MR. LEVITES: Objection.

15 You can answer.

16 A Yeah, I think that's right.

17 Q And for the other two it's hard to say
18 because you didn't inspect the internal components of
19 those batteries?

20 MR. LEVITES: Objection.

21 You can answer.

22 A I think somebody else was going to do
23 that.

24 Q Okay.

25 But in any event you are confident that

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1 four of them went into thermal runaway?

2 A That's what the appearance is.

3 Q Okay.

4 Now, that thermal runaway could have
5 occurred by something that happened inside the cells
6 or by heat that was applied from the outside to the
7 cells, correct?

8 A Correct.

9 Q Are there any other possibilities that
10 you considered?

11 MR. LEVITES: Objection.

12 You can answer.

13 A No. I think that's the only two ways
14 they go into thermal runaway. Well, I mean, we did
15 talk about one cell starting the process and the heat
16 propagating to the other one. But I think that's
17 just a different version of the cells going into
18 thermal runaway because of a problem in the cells.

19 Q Right.

20 Okay.

21 So, the issue really, then, is in this
22 case is determining which it was; whether it was
23 something internal through a cell or whether it was
24 external heat, right?

25 A Right.

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1 Q And your opinion is that it was -- or
2 your hypothesis is that it was external heat?

3 A Correct.

4 Q Now, you are not --

5 I think you established you are not a
6 fire cause and origin expert?

7 A Not a certified fire cause and origin
8 expert.

9 So, I don't go into a building and look
10 at a fire pattern and that sort of thing, the
11 classical activities of fire investigators. On the
12 other hand, I look at burnt appliances with plastic
13 and circuit boards and all the stuff electrical
14 things are made of all the time. So, I have plenty
15 of experience doing that.

16 But I don't go in a room and say, "Here
17 is where the origin was" because I can tell from the
18 "V" pattern on the wall.

19 Q In this case, have you determined what
20 the ignition source was of the external fire that you
21 say caused the thermal runaway?

22 MR. LEVITES: Objection.

23 A I have not.

24 Q And have you reached an opinion as to
25 where the fire started in what room of the house?

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1 MR. LEVITES: Objection.

2 You can answer.

3 A No, I have not.

4 Q So, your hypothesis is limited to your
5 opinion that it was an external fire but you don't
6 know where that fire started or what started it?

7 MR. LEVITES: Objection.

8 You can answer.

9 A That's right. That's correct.

10 Q Now, you said that you looked at about
11 250 pictures that Mr. Gorbett, the fire investigator
12 hired by HP, to investigate this fire provided,
13 correct, or you got through the attorneys?

14 MR. LEVITES: Objection.

15 You can answer.

16 A Yes.

17 Q In those 250 pictures, did you see any
18 pictures of something other than the laptop that
19 could be an ignition source?

20 MR. LEVITES: Objection.

21 You can answer.

22 A I don't think I saw any ignition
23 sources. Well, no, I take that back. I take that
24 back. I saw things that looked damaged in an unusual
25 way. But to my knowledge, nobody who is a fire

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1 investigator said "oh, we found this."

2 For example, the furnace looked very
3 badly heat damaged. The closet in that room where
4 the laptop was located had a lot of burning in it,
5 but we didn't find anything or --

6 They collected all that evidence and we
7 didn't find anything suspicious in the closet. So,
8 although there were some areas like that where I
9 thought they looked odd, there was nothing specific
10 that any the fire investigators or I found that was
11 an electrical item that I would have been, you know,
12 instructed to look at.

13 Q Were you aware that the internal cell
14 contents of at least one of the cells was found in
15 the debris inside the closet that you are describing?

16 A I don't remember that.

17 Is that where it was found?

18 Q Did you review Mr. -- the FRT fire
19 investigator's report that documented that?

20 MR. LEVITES: Objection.

21 You can answer.

22 A I don't -- I don't -- I don't recall.
23 I don't recall that. I think I read his report. But
24 I think I read all the reports. But there were many
25 reports. That may be something I forgot.

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1 Q Did you look at any pictures of the
2 debris that were removed from the closet that were
3 taken by Mr. Gorbett?

4 MR. LEVITES: Objection.

5 A I did.

6 And I think that they retained most of
7 the closet material and I looked at it at the
8 evidence exam.

9 Q And you are saying you have no
10 recollection of seeing the copper internal jelly roll
11 windings of at least one of the cells in that debris?

12 A I don't remember it as I am sitting
13 here right now, but I may have seen it.

14 Q Okay.

15 So, other than the closet and the
16 furnace, did you come to some conclusion that the
17 furnace could have started the fire?

18 A No, I didn't. I just thought that --

19 It was mentioned a couple of times in
20 some reports and I saw a couple of pictures of it
21 that looked odd. But I couldn't really tell whether
22 they were --

23 I didn't study it in much detail so I
24 couldn't tell whether they were simply smoke staining
25 from the smoke layer in the room in the upper part of

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1 the furnace or not. But there was a part --

2 I remember looking at part of the
3 furnace and part of it looked like it was painted and
4 part of it looked all black. So, I couldn't really
5 tell whether that was just a result of a smoke
6 staining, which everything was subjected to.

7 Q Did you review the Madder report
8 computer photographs of the building?

9 A I think so.

10 Q And do you know what that is?

11 It's a 3D --

12 A I know what it is. I know what it is.

13 Q I am just asking. I'm sorry. I didn't
14 mean to insult you.

15 A And I apologize for getting snippy with
16 you. It's late in the day.

17 Yeah, Gorbett normally takes --

18 Well, there may be other people that do
19 it, too. But I frequently see Madder report scans.

20 Q And my question is did you review the
21 Madder report scan of the entire building that Mr.
22 Gorbett took in this case?

23 A I think that I did. I don't remember
24 make much of it. But I remember seeing pictures that
25 had --

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1 The Madder report images frequently
2 leave a -- on the ground in a place where I guess
3 where the scanning was done at some point. I
4 remember seeing a bunch of images like that and
5 looking around at things. But I didn't see anything
6 that jumped out at me.

7 Q Did you review the measurements taken
8 from the Madder report scan that showed the line of
9 demarcation on the wall that the thermal layer came
10 down to?

11 MR. LEVITES: Objection.

12 You can answer.

13 A I don't -- I don't --

14 I am not surprised that they were
15 there. I remember reading something in one of the
16 reports about how far down it came. But I don't
17 remember looking at the Madder report for that -- the
18 Madder report scans for that particular dimension.

19 Q I believe your hypothesis is, is that a
20 thermal layer of a fire of an unknown ignition source
21 in an unknown place was created in the office
22 sufficient to heat the laptop to batteries to thermal
23 runaway, correct?

24 A Correct.

25 Q So, the line of demarcation of where

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1 the discoloration of the walls, how far down they
2 came, would be relevant to the likelihood that a
3 thermal layer got down to the level of the laptop,
4 correct?

5 MR. LEVITES: Objection.

6 A Well, I'm not sure that's quite
7 correct. Because really what you are talking about
8 is a hot layer that's radiating down and I am not
9 sure that --

10 The hot layer has a thickness to it
11 from the top of the ceiling to somewhere. And just
12 because there is a smoke stain on a wall 2 feet or 3
13 feet doesn't mean that's where all the heat is coming
14 from.

15 Q What is the basis of that opinion, that
16 you just provided?

17 A The hot layer is infrared radiation.
18 And infrared radiation is different than there is
19 smoke on the wall. In other words, the height where
20 that comes from is not the same as the layer that's
21 doing all the radiation or even its shape sometimes.
22 So, you have to be careful about that. So, they are
23 related, but they are different.

24 Q My question is what training or what
25 literature are you referring to that says that the

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1 damage from the heat on the wall is not equivalent to
2 the layer -- the level of the thermal layer?

3 MR. LEVITES: Objection.

4 A I don't think I read anything that says
5 that. I think somebody told me that once, but I --

6 Q Somebody that was a fire investigator
7 or just somebody --

8 A Could be it was a fire investigator.

9 Q Did Mr. Gorbett ever tell you that?

10 A I don't remember who it was. I don't
11 remember how I learned it. I would have to think
12 about that.

13 Q So, based upon what you said, then, you
14 are not claiming that you have expertise in this area
15 that you can offer an opinion on that since you don't
16 remember where you got that information, correct?

17 MR. LEVITES: Objection.

18 You can answer.

19 A Listen, here is the way it works. You
20 got melted plastic on top of the computer. I looked
21 up the data sheets for the melted plastic, for the
22 plastic, and it says one of the plastic melts around
23 200 degrees C. One of the plastics has to be a
24 liquid. And the injection molding (phonetic) has to
25 be processed between 260 and 290 C. That's what I

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1 know. I don't care where the heat came from. I'm
2 telling you it got to that temperature. And if it
3 got to that temperature at the top of the laptop, it
4 certainly was very hot.

5 Q Okay.

6 A So, there is enough radiant heat to do
7 that and melt the keyboard keys made of similar
8 plastics. So, it doesn't really matter to me whether
9 you interpret the infrared radiation 2 feet high or 3
10 feet high from the ceiling because it's saying, well,
11 we know as a fact that the melted plastic -- the
12 plastic had to get above 200 C to melt.

13 Q Right.

14 My question --

15 I'm sorry.

16 What I am asking is, first of all, is
17 your knowledge of the thermal layers sufficient to
18 indicate that you have an opinion that the thermal
19 layer caused that damage. And I think you said that
20 you don't have knowledge of the thermal layer
21 expertise sufficient to make that opinion. Your
22 opinion is based on the damage to the laptop.

23 Is that a fair assessment?

24 A Correct. Fair assessment.

25 Q Now, the temperature reached by thermal

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1 runaway of cells is well in excess of that
2 temperature that you described was necessary to melt
3 the plastic, right?

4 MR. LEVITES: Can you repeat the
5 question?

6 A Can you repeat the question? Something
7 sounded funny.

8 Q A thermal runaway reaction in an 18650
9 cell reaches temperatures far in excess of what was
10 required to melt plastic?

11 MR. LEVITES: Objection.

12 A Oh, that's correct. Yes.

13 Q So, one possibility is this radiant
14 heat from the thermal layer hypothesis and another
15 possibility is that the heat that melted the plastic
16 that you are describing came from the cells?

17 MR. LEVITES: Objection.

18 You can answer.

19 A Yeah, I don't think that's a
20 possibility because the surrounding area isn't
21 completely melted or damaged.

22 Imagine you got --

23 From the damage on the above the
24 keyboard --

25 I am not saying that correctly.

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1 The damage on the top of the laptop
2 between the keyboard and where the screen starts,
3 that's where the batteries melted the laptop. If the
4 temperatures there were very high, yes, that would
5 radiate some heat. But the problem is the edges of
6 the laptop display are closer to that and they didn't
7 melt. So, clearly if we know whatever radiation
8 takes place, doesn't matter how you deal with it, the
9 things closer to it is going to get hotter. And so,
10 since the things closer to it didn't get hotter, it
11 didn't cause a lot of radiation at that point. So,
12 it can't be that the radiation selectively melted
13 that part of the top of the laptop display. You
14 can't melt the top without melting the sides so
15 radiation goes --

16 Q You previously testified about the
17 venting that occurs in thermal runaway of hot gases.

18 A Do you remember that?

19 A Yes.

20 Q And that venting occurs in directions
21 that the vents permit, correct?

22 A Yes.

23 Q And have you witnessed --

24 Again, I think I asked you this.

25 But have you ever witnessed a cell in

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1 thermal runaway and the jet of ignited fuel that is
2 expelled during that venting process?

3 MR. LEVITES: Objection.

4 You can answer.

5 A Absent the process I see the cells, but
6 not during the process. You make it sound like I was
7 witnessing it occurring. I never witnessed it
8 occurring. What I've seen is the result after the
9 venting occurred.

10 Q So, you never saw one of the experts
11 that they videotaped that shows the venting of the
12 gases and how the hot gases send out a flame in the
13 direction of the vent?

14 MR. LEVITES: Objection.

15 You can answer.

16 A The experience that I've had when I've
17 seen it is the cell has an axis and along that axis
18 at the top of the cell are vent holes. And the gas
19 goes along that axis out. And I see melted metal
20 along those holes. Along in the direction of that
21 axis. The venting goes up and sort of -- not upward,
22 but it goes along the axis of the cell. Not up the
23 screen. The batteries are lying horizontally. The
24 gas goes horizontal.

25 Q And two of those batteries that were

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1 lying horizontally exploded and ruptured their
2 contents, and you say they couldn't have gone upward?

3 MR. LEVITES: Objection.

4 A The material went on the floor
5 somewhere. So, they didn't go upward.

6 Q So, your --

7 A The gases are exposed very quickly when
8 they expel their contents. I think you are talking
9 about venting. Now you are talking about explosion.
10 So --

11 Q We've moved on to explosion.

12 But the contents of the battery cells
13 of the exploded cells and the other cells were not in
14 the cells when they were found, correct?

15 A That's correct.

16 MR. LEVITES: Objection.

17 Q And the contents of the batteries were
18 found all over the room?

19 A Okay. Correct.

20 Q Okay.

21 So, you are saying that none of that
22 material exploded upward?

23 MR. LEVITES: Objection.

24 You can answer.

25 A I am saying they didn't --

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1 The explosion didn't generate heat that
2 was stationery long enough. If it expelled foil in
3 one direction or up or around, it happened quickly
4 and then it was over. So, there wasn't any time --

5 There had to be constant heat exposure
6 in order to melt plastic like that.

7 Q So, a super heated piece of metal that
8 impacts the screen wouldn't melt it?

9 MR. LEVITES: Objection.

10 A Impacts the metal and bounces off.
11 It's not going to melt it.

12 You say super heated.

13 What do you mean "super heated"?

14 Q Six or seven hundred degrees Celsius.

15 A Once it starts --

16 Something at 600 degrees Celsius, the
17 battery temperature can get to, once it expels foil
18 in the air, it's going to cool down really quickly.
19 I am not sure that --

20 Q So --

21 A Wait, okay?

22 I don't think that that hitting
23 something, transfer of heat, will melt the plastic.
24 What you are looking at, it looks like it drips down.
25 That's something that took a little time to take

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1 place.

2 Q What basis, what methodology, did you
3 use to come to the conclusion that something 600 or
4 700 degrees Celsius that travels an inch or two up to
5 the screen is going to cool down enough not to melt
6 the plastic?

7 MR. LEVITES: Objection.

8 A What's your basis for knowing that it's
9 an inch or two on a 12 inch screen? Come on. If you
10 are going to formulate questions and quiz me, get
11 some details correct.

12 Q I will change my question.

13 What is the basis of your opinion that
14 a piece of battery material heated to 6 or 700
15 degrees Celsius that travels 10 inches is cooled
16 sufficiently so that it is not hot enough when it
17 impacts the plastic screen --

18 A If you are asking me did I do an
19 experiment or look at a book or have a calculation?
20 No. Have I experimented with things exploding in
21 foil? Yes. And so, you know, you are saying it
22 melted the plastic that way. Well, if it hit the
23 plastic lid of a laptop and bounced off, there
24 wouldn't be enough time to transfer any heat to the
25 plastic to make it drip down like it was sitting in a

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1 hot room. Okay? So, that appearance is different
2 than a flying object anyway. So, what you are
3 suggesting is just not reasonable from an engineer
4 standpoint.

5 Q From an engineering standpoint, a
6 uniform hot layer in your view, applying that heat
7 directly, would produce/TKUGS the pattern that is
8 shown on this laptop with a small area that's melted?

9 A Sure.

10 Q Okay.

11 And can you explain the methodology
12 behind your conclusion that a uniform hot layer would
13 show the type of damage here where only a small area
14 of the screen is melted?

15 MR. LEVITES: Objection.

16 You can answer.

17 A Just my experience of looking at melted
18 equipment that's caught on fire scenes.

19 Q So, your experience in looking at fire
20 scenes leads you to the conclusion that --

21 A A --

22 COURT REPORTER: I can only get one
23 voice at a time.

24 A I said my experience of looking at
25 melted equipment coming out of fire scenes. I didn't

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1 say looking at fire scenes.

2 Q So, your opinion of --

3 Your experience at looking at equipment
4 that's removed from fire scenes has informed you that
5 a uniform hot layer can create damage to one portion
6 of a screen but no damage to another portion of the
7 screen?

8 MR. LEVITES: Objection.

9 You can answer.

10 A First of all, I don't think there is no
11 damage to the other portion of the screen. Yes, it
12 is more on one side than the other, yes, it is.

13 Q Well, the part that is dripping is only
14 on one side, correct?

15 MR. LEVITES: Objection.

16 A I think there is melting across the top
17 to different degrees, but that's where it's melting.

18 MR. LEVITES: Why don't we put the
19 picture up and we can actually talk about
20 the picture.

21 MR. SCHWARZ: We can actually look at
22 the photograph that is in the book and that
23 is --

24 That is not there. Sorry. Let me find
25 it for you. I think it's in your report.

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1 MR. LEVITES: His report. Page 12.

2 MR. SCHWARZ: Figure 13.

3 Q In your report, is it your testimony
4 that there is uniform damage to the screen?

5 MR. LEVITES: Objection.

6 A Well, in the -- what looks like 6
7 inches across, it's melted. There is melting on the
8 left side and melting on the right side. Both were
9 dripping of plastic.

10 Q But --

11 A Maybe the left side is actually a
12 little bit higher than the right side. But there is
13 no localized dripping on one side and nothing on the
14 other side. So, you are asking questions about --
15 and I think misinterpreting my photographs; the
16 condition of the laptop.

17 Q Okay.

18 The picture will speak for itself.

19 Now, if you would turn to tab 22, which
20 is also Exhibit 22.

21 A Are you going to ask me to send this
22 back to you?

23 Q No. You can keep it, with my
24 compliments.

25 A Too bad you didn't autograph it for me.

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1 Just kidding.

2 Q I will send you one.

3 A Tab 22? Is that what you said?

4 Q Yes.

5 A Okay.

6 Q The Larsson article.

7 This is an article that was referenced
8 in Dr. Martin's rebuttal report. And it is a study
9 that was done by Larsson, et al -- L-A-R-S-S-O-N --
10 where they tested your theory of external heating of
11 battery cells of the 18650 type to see what
12 temperature and over what period of time it takes to
13 put them into thermal runaway from an external
14 heating source.

15 Did you have a chance to look at this
16 article after Dr. Martin cited it in support of his
17 opinions?

18 A Actually, I don't remember looking at
19 it. I was instructed to, but I don't remember
20 looking at it. So, would you mind telling me what
21 particular area you're --

22 Q Yeah. I want you to turn to table 3,
23 which is on page 225 of the article.

24 Take your time and look at any other
25 part you want to.

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1 A I'm making a mess of everything here.

2 MR. LEVITES: Would it help if we put
3 it up so we can blow it up on the screen?

4 The table?

5 THE WITNESS: I think so but --

6 Q Can you read table 3?

7 A If there is something specific you want
8 to call my attention to?

9 I am having trouble interpreting the
10 thing, so.

11 Q So, let's go through it now and see if
12 I can help explain it to you.

13 According to this article, the
14 researchers took 14 lithium-ion cells and put them in
15 an oven that was 300 degrees Celsius.

16 And if you want to look at the
17 beginning of the article, you will find that data.

18 A Okay.

19 They put it in the oven at 300 C.

20 Q Right.

21 And the cells were --

22 Some of the cells were brand new and
23 some of the cells were dead and other cells were
24 cycled a number of times. That appears in the second
25 column as the number of cycles they have been

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1 through. And some of them were stored at a high
2 temperature just to try to determine whether any of
3 these actions would change their reaction to the
4 heat.

5 Do you see that?

6 A Yes.

7 Q And then, the fourth column over or the
8 fifth column over -- excuse me -- is the time at 300
9 degrees C and at a 300 degrees C oven it took for the
10 cells to go into thermal runaway. And in all the
11 cells no matter what condition they were, it took
12 between 60 and 72 minutes for thermal runaway to
13 occur at 300 degrees Celsius.

14 Do you see that?

15 A I think I see the data that you are
16 referring to.

17 Q Okay.

18 So, the cells that were put into this
19 300 degree oven took over an hour at 300 degrees to
20 go into thermal runaway.

21 Is that how you interpret this data?

22 A That's what it looks like. I haven't
23 read the text.

24 Q You are free to read at some point.
25 You can read it now if you want. We will go off the

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1 record.

2 A No, that's fine. That's fine.

3 Q All right.

4 Now, the cells in the laptop at issue
5 in this case were not --

6 Withdraw that question.

7 The cells in the laptop in this case
8 were first enclosed in the battery pack plastic,
9 correct?

10 A Correct.

11 Q And then, the individual cells were
12 wrapped in another kind of plastic?

13 A In the purple stuff.

14 Q Okay.

15 In purple wrapping?

16 A Wrapping, right.

17 Q Would you agree with me that the heat
18 transfer in the Larsson study from the oven
19 temperature to the metal cylinders would be more
20 efficient than heat transfer if they had put the
21 plastic laptop battery pack and the wrap cells into
22 the oven?

23 MR. LEVITES: Objection.

24 You can answer, Don.

25 A Well, it could be.

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1 But I have a question, which is, like,
2 were the cells in Larsson heated beforehand or they
3 were at room temperature and then put in 300 degrees
4 C?

5 Q Well, I believe they were put in at
6 room temperature and left in for 60 to 73 minutes
7 before thermal runaway occurred.

8 A Because you don't realize that the
9 laptop batteries were undercharged for some period.
10 You know, the fire started at 2:00 in the morning.
11 They might have been charged for eight hours before.

12 And the insulation that you pointed out
13 goes both ways. In other words, the insulation of
14 the laptop case or the battery case prevents heat
15 from going from the outside to the cells. But it
16 also prevents heat from going from the cells to the
17 outside. So, the cells get hot. So, I don't know
18 what the cells were when the fire started or even
19 when the fire started. But what I am saying is this
20 is a different experiment, a different kind of
21 experiment if they started at room temperature.
22 Because I don't think those laptop batteries were at
23 room temperature especially if they were in a pack
24 that had no safety regulation mechanisms in it.

25 Q These had no safety regulations either.

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1 They were just the cells. They weren't the battery
2 pack.

3 A But what I am saying is they were at
4 room temperature before they were put into 300
5 degrees C. The ones in the laptop were heated before
6 anything happened to the room.

7 Q In your opinion, would that change the
8 temperature that would be required or the time it
9 would be required to be at that temperature?

10 MR. LEVITES: Objection.

11 A Yes.

12 Q Which one?

13 A Yes, both.

14 Q So, explain that one to me.

15 If a battery starts at 40 degrees
16 Celsius or actually 20 degrees Celsius versus a
17 battery starts at 40 degrees Celsius, explain to me
18 why the temperature it reaches to get to thermal
19 runaway would be different?

20 A No, I didn't say the temperature
21 reaches for thermal runaway. I said the time. In
22 other words, if the batteries are being charged in
23 the laptop before the fire starts, they are already
24 warm from being charged. So, they are heated up
25 before they are exposed to external heat from the

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1 fire. So, you have to take --

2 I don't know how to take that into
3 consideration, but it certainly would make things go
4 faster --

5 Q Okay.

6 A -- than if you had them at room
7 temperature and put them in a 300 degree Celsius
8 oven. Now we got apples and oranges. Like, we don't
9 necessarily have a 300 degree Celsius room in the
10 fire right, but we do have it in the lab.

11 So, I think there is some analysis that
12 needs to be done to correspond the data from the
13 Larsson to what was going on. And we don't know
14 really exactly what was going on in the laptop in the
15 fire, so.

16 Q What data have you found that suggests
17 that a different temperature and time period, a lower
18 temperature and a shorter time period, can put --
19 from external sources can put cells into thermal
20 runaway?

21 MR. LEVITES: Objection.

22 You can answer, Don.

23 A I am not sure I --

24 Q Let me rephrase it.

25 I think it was awkwardly asked, and I

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1 apologize.

2 What data are you relying upon from any
3 study that would show a different time period and
4 temperature from an external source that would put
5 cells into thermal runaway?

6 MR. LEVITES: Objection.

7 You can answer.

8 A Let's suppose you say we have to get to
9 a certain temperature, 300 degrees Celsius. What I
10 am saying is that if the batteries -- if the
11 batteries in Larsson start out at room temperature
12 and they go to 300 degrees C and it's by conduction
13 from the air, that's different than the batteries --

14 And it may be this is longer. I don't
15 know which way it's going to go.

16 What I am saying is that the batteries
17 that were in the laptop were being charged for some
18 number of hours before the fire in the room starts.
19 And that means they are warmer. And so, then when
20 they are exposed to a heat from the room, they start
21 out at a higher temperature. And it may take them
22 longer --

23 It may take them less time to get to
24 thermal runaway. I am not saying it does. I am
25 saying you have a thermal experiment in Larsson and

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1 the thermal experiment being done in the Marcellin
2 house is completely different.

3 Q Okay.

4 And that's what my question is.

5 What data, other than your assumptions,
6 do you have to indicate that the time period and the
7 temperature at Larsson would not apply to the case
8 here?

9 MR. LEVITES: Objection.

10 A You are doing a temperature rise
11 experiment. All engineers are trained in physics.
12 Okay? So, the idea that you are doing a temperature
13 rise experiment under different conditions than
14 another temperature rise experiment doesn't require a
15 PhD in physics. They are different experiments.
16 They may have different outcomes.

17 And what I am saying is, as I sit here
18 right now, I can't tell you how to interpret Larsson
19 relative to this. Does Larsson immediately mean that
20 Marcellin couldn't happen the way I say? I don't
21 know. Okay? I am saying it's different. So, you
22 can't just take this from Larsson and go, "oh, it is
23 taking at least an hour to heat up" but the situation
24 is completely different. And the starting
25 temperatures are different. So, you are saying, "oh,

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1 it's different." How do I know the outcome is going
2 to be different if the starting condition is
3 different? That doesn't make any sense. Physics
4 experts contain a certain amount of rules. And one
5 of the rules is if the starting conditions are
6 different, then the outcomes might be different.
7 What you are doing is changing the condition in the
8 test.

9 And then you are saying what proof do I
10 have that it's going to make a difference. You don't
11 do physics experiments, change all the conditions and
12 then get surprised there's a difference in the
13 outcome. That's the way physics works.

14 Q That wasn't my question.

15 My question is what data do you have
16 that you are relying upon --

17 A If you change one of the conditions?
18 Stop asking me the same thing over again. This is
19 not fair. This is ridiculous what you are doing.
20 Okay?

21 All I said is that if you have an
22 experiment that is done under different conditions,
23 you can expect different outcomes. I don't need data
24 that proves that. Okay? My physics training as an
25 engineer knows that's what happens. You got an

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1 experiment and if you got different conditions, you
2 might get different results. That's all I am saying.

3 Q I am not quibbling with that answer.

4 What I am asking you is are you
5 familiar with any studies that more approximate what
6 you think happened at the Marcellin house that would
7 allow to provide an estimated temperature that would be
8 be required and an amount of time that would be
9 required to put the cells into thermal runaway that
10 would show the difference between what you think
11 happened in Marcellin and what happened in this
12 Larsson paper?

13 A Okay. I understand your question. And
14 no, I don't know of any studies that did that.

15 In other words, like, somebody who did
16 a bunch of studies where the batteries were more in
17 the situation like in the Marcellin situation.

18 Q Okay.

19 So, I think your answer, then, is that
20 you don't believe the Larsson data is --

21 A I --

22 Q Let me please finish my question and
23 then you can answer.

24 I believe you were saying that the data
25 in the Larsson paper is not going to be identical to

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1 what you would expect to happen if the cells were
2 plugged in and charging and in the plastic casing but
3 you can't tell how different they would be?

4 MR. LEVITES: Objection.

5 A I think that's a fair statement.

6 Q Okay.

7 A To be fair, I apologize for not having
8 read the Larsson, and I just did. But it looks like
9 there is a lot of material here before you get to
10 table 3. I got to understand all of what they are
11 saying.

12 Q In your report -- I'm sorry I don't
13 have the exact page because I forgot to write it
14 down -- you indicated that there had never been any
15 fires associated with this particular laptop model.

16 Do you remember making that statement?

17 A Yes.

18 Q And where did you get that information?

19 A I thought I got that from HP discovery
20 responses.

21 Q Okay.

22 And so, the other fires of laptop
23 battery packs that were counterfeit battery packs
24 that you talked about that you've seen over the last
25 ten years were not Pavilion Laptop battery packs;

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1 they were some other model of HP?

2 A Pavilion is a --

3 I am sorry. I am going to answer your
4 question. I just want to clarify. Pavilion is not
5 the complete model name of this laptop. It's a
6 Pavilion DV6-3210US. And so, I think the question
7 that was asked of HP was the specific model number.
8 There had been --

9 As far as I know, there had been no
10 other fires or fire claims.

11 Q So, were any of the fires or fire
12 claims that you investigated of HP laptops involving
13 a Pavilion series that's a different Pavilion series?

14 A Not --

15 I don't recall any being a Pavilion.

16 Q Okay.

17 A But as I am sitting here right now, I
18 can't remember you know, six cases over five years.
19 I can't remember the model numbers of all the
20 laptops.

21 Q Right.

22 So, with regard to the ones that even
23 if you can't remember the model numbers, were the
24 batteries associated with the counterfeit battery
25 packs, were they six cell battery packs?

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1 A I don't remember.

2 Q Did they have --

3 A You know, I guess --

4 I am sorry. Let me just finish.

5 There are 4-cell battery packs, 6-cell
6 battery packs, 8-cell battery packs. So, there is a
7 variety. And I don't remember which ones -- which
8 ones the allegations were made for.

9 Q But on some of those battery packs you
10 found that they lacked the safety accessories or
11 functions that were designed to prevent thermal
12 runaway, correct?

13 A Correct.

14 Q And we've established that that was
15 common to this battery pack as well?

16 MR. LEVITES: Objection.

17 You can answer.

18 A Correct.

19 Q And what other significant differences
20 were there between the battery packs that you
21 determined had gone into thermal runaway because they
22 lacked those safety devices?

23 What differences were there between
24 those and the Marcellin battery pack?

25 A I am sorry. That would require me

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1 getting the files out and trying to compare those. I
2 can't certainly do that from memory.

3 Q So, as you sit here today, you can't
4 think of any major distinction between the ones that
5 you determined went into thermal runaway because they
6 lacked the safety devices from the one that you
7 investigated in this case?

8 MR. LEVITES: Objection.

9 A That's correct.

10 Q You opined in reference to Dr. Martin's
11 opinion about a secondary protection system that HP
12 could have designed into this laptop which involved
13 being able to detect whether there was no thermistor
14 and no temperature signal was sent to the
15 motherboard.

16 Do you recall that?

17 MR. LEVITES: Objection.

18 You can answer.

19 A No.

20 I mean, can you tell me where that's in
21 my report?

22 Q Sure. I will find it.

23 A I think it's on page 19.

24 Q It is. Yeah, it is on page 19.

25 Just tell me when you are ready.

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1 A Yeah.

2 So, what is your question?

3 Q I just wanted to remind you that you
4 have that opinion and then I am going to ask you
5 questions.

6 A Okay.

7 Q So, your --

8 Dr. Martin had an opinion that if the
9 laptop was programmed to expect a signal from a
10 thermistor and battery pack, it didn't receive it, it
11 could be programmed to shut down the charger in that
12 circumstance.

13 Do you recall that?

14 A Yeah, I think I do.

15 Q And do you recall that Mr. PiPho, when
16 he was deposed, said that that was a feasible design
17 that could have been implemented.

18 Do you recall that?

19 A I think so.

20 Q Okay.

21 So, your counter to that was that, that
22 would be an easy system to defeat by instead of
23 installing a thermistor, you can install a resistor
24 that would send a constant temperature to the
25 motherboard and defeat that type of safety system?

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1 A Yes.

2 Q My first question is are you aware of
3 any counterfeiter employing that sort of device to
4 fool the motherboard into thinking that there is a
5 thermistor?

6 MR. LEVITES: Objection.

7 You can answer.

8 A I think I've seen thermistors on the
9 BMU. Not wired to the BMU, the sensing battery. But
10 the thermistors that were there on the BMU connected
11 to pin 6 of the connector.

12 And in general, when I am discussing
13 these kind of issues with other engineers, they have
14 said they have seen things like that. So, although I
15 don't remember seeing anything very specific written
16 down, it would be an easy matter to put a thermistor
17 or a resistor on the board and fool the HP computer
18 to thinking there was a thermistor there and the
19 temperatures were constant.

20 Q If I understand you, you are saying
21 some unnamed engineers told you this?

22 A They said they had seen things like
23 that. Seeing things, like, putting extra resistors
24 on the BMU in place of thermistors or in place of the
25 cell -- independent cell hold that's measuring

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1 systems. And I know I've seen thermistors on the BMU
2 that were connected to the connector. I don't
3 remember where they were. You know, what case it
4 was. But I saw those ones. Maybe it was not a
5 case -- what I was looking at, I knew to be non-OEM
6 HP packs. That the thermistor weren't actually wired
7 to anything. They were just on the BMU.

8 So, when the computer looked at the BMU
9 connector voltages, the computer will see a voltage
10 that looked like there was a thermistor there. The
11 thermistor wasn't really measuring anything. So, I
12 know at least somebody did that once, but I don't
13 remember where it was, which case it was.

14 Q Okay.

15 I am confused. I'm sorry.

16 The design that Dr. Martin had
17 suggested would be the actual data on temperature was
18 being transferred from the thermistor to the computer
19 to the motherboard and that that temperature data,
20 then, if it was completely absent, the computer could
21 be programmed to shut down the charge. That was the
22 premise of that.

23 Your opinion in your report was that,
24 that type of system could be fooled by replacing a
25 thermistor with a resistor that sent just one steady

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1 signal of temperature and not a variable signal and
2 that would fool that system. That is what your
3 opinion was.

4 And my question was are you aware of
5 some example of a counterfeiter replacing a
6 thermistor with a resistor like you said could be
7 done in your report?

8 MR. LEVITES: Objection.

9 You can answer, Don.

10 A Yeah, I don't think I can tell you I
11 have pictures of that or measurements of that. What
12 I can tell you is that I've seen BMUs with
13 thermistors on the board that were supposed to be
14 measuring battery temperature, which were not really
15 measuring battery temperature. And if a thermistor
16 could be put on the board measuring something or they
17 appear to be measuring something, it can certainly
18 replace that thermistor with a resistor and then the
19 laptop would not know that it was not measuring a
20 temperature.

21 MR. LEVITES: Let's take a break now.

22 MR. SCHWARZ: Let me finish this line
23 of questioning, please.

24 Q If there is a thermistor on the board
25 that is not measuring anything, then that wouldn't be

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1 sending any signal to the motherboard, correct?

2 A I am not sure that you are
3 characterizing that correctly.

4 Q Well, you said the thermistor was not
5 doing anything on the boards that you've seen.

6 A Stop telling me what I said. Okay?
7 What I am telling you is that the resistor -- the
8 thermistor that you put on or the resistor that you
9 put on would still be sending some signal. There
10 still would be a voltage measurement when interpreted
11 by the laptop. So, even though it wasn't sending --
12 it's not that it's not sending anything. It's not
13 sending any information that is useful in terms of
14 determining battery temperature.

15 So, once you put that part on, whether
16 it's a thermistor or a resistor, it's not measuring
17 battery temperature. So, the laptop has no choice
18 but to interpret that as a fixed temperature battery
19 measurement. And then, it must say, "oh, well, the
20 temperature is okay, I will keep charging this" even
21 though it's not really getting a temperature.

22 Sorry if I am not making that any
23 clearer.

24 Q No, I think I understand.

25 Now, let me just restate it so I can

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1 understand.

2 So, in the examples that you are giving
3 you saw a thermistor that was not associated with the
4 battery so it's not picking up the battery
5 temperatures?

6 A Correct.

7 Q Okay. That I understand.

8 Thank you.

9 MR. SCHWARZ: We can take a break now.

10 VIDEOGRAPHER: The time is
11 approximately 5:30.

12 We are going off the record.

13 (Whereupon, a short break was taken)

14 VIDEOGRAPHER: The time is
15 approximately 5:41.

16 Back on the video record.

17 Q Mr. Galler, would you turn to page 20
18 of your report, which is tab one, Exhibit 1.

19 Let me know when you are there.

20 A I have my report.

21 Q You are on page 20?

22 A I am.

23 Q So, there you have listed eight
24 opinions; is that correct?

25 A Yes.

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1 Q And you indicated at the top paragraph
2 there that you are providing all of those opinions or
3 conclusions to a reasonable degree of engineering
4 certainty?

5 A Correct.

6 Q Okay.

7 So, the first one I want to ask you
8 about is number 3.

9 And number 3 reads:

10 "Plaintiff's experts have not
11 scientifically proven that an
12 authentication scheme, if it had been
13 installed when the notebook computer was
14 made by HPI, would actually still be on the
15 computer at the time of the Marcellin
16 fire."

17 Did I read that correctly?

18 A Yes.

19 Q So, are you --

20 Is this opinion saying that if HP had
21 used an SHA-1 authentication system at the time of
22 manufacture that Plaintiff's experts haven't proven
23 that it wouldn't somehow have been removed by 2020?

24 MR. LEVITES: Objection.

25 You can answer, Don.

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1 A Removed or altered. I mean, you know,
2 you do things with a computer. You load new software
3 on the computer. You know, you are doing an
4 experiment with your computer in a legal setting.
5 And you are saying, you know, authentication wasn't
6 there. And so, you verify it was not there or if it
7 was there. So, I think that is something they should
8 have done and they didn't do it.

9 Q Well, we read Mr. Atkinson's testimony
10 that there were no other authentication systems on
11 any HP computers until 2019.

12 Do you recall that?

13 MR. LEVITES: Objection.

14 A Yeah.

15 Q So, is it that you are saying that the
16 Plaintiff's experts didn't verify what Mr. Atkinson
17 swore to under oath on behalf of HP or are you saying
18 that somehow the operator of this laptop could have
19 figured out how to deactivate the authentication
20 system if it had been there?

21 MR. LEVITES: Objection.

22 A Yeah. Well, not that it's deactivated,
23 but just somehow made it not functional anymore.

24 Q What is that based on?

25 In other words, are you familiar with

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1 some case or some study or people removing
2 authentication systems that had SHA-1 algorithms?

3 A What I am saying is that the hacking
4 articles that I read talked about getting into the
5 imbedded controller; the thing that controls the
6 computer when it's off but charging, is a separate
7 processer and it has separate programming. And that
8 the hackers had gotten to that and made some
9 alterations. So, I guess my question, you know, or
10 sort of is how do they know that even if there was
11 authentication, how did they know that it would not
12 have been modified or could have been modified. And
13 so, I guess that was my concern. That they didn't
14 verify that anybody had messed around with the
15 computer in any way. In other words, altered the
16 computer in any way.

17 Because if they altered the computer or
18 the imbedded controller in any fashion, that meant
19 they could have somehow -- not necessarily defeat it,
20 which made the authentication --

21 If it were there. I know you are
22 saying it wasn't supposed to be there because HP
23 testified it wasn't there. What I am saying is even
24 if it was there, could somebody have gotten in and
25 done something to it. And so, there was no

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1 investigation of that process.

2 Q You read Ms. Marcellin's testimony,
3 right, from her deposition?

4 A Uh-huh.

5 Q And she was asked numerous times if
6 that computer was modified in any way and she said it
7 wasn't other than the battery pack, correct?

8 MR. LEVITES: Objection.

9 You can answer.

10 A Yeah, that's right. That's right.

11 Q So, did you read that deposition and
12 interpret Ms. Marcellin's computer skills as being at
13 the level of a hacker that could change the software?

14 A No. Probably not.

15 Q Okay.

16 So, you are saying that the Plaintiff's
17 experts didn't prove that a hacker couldn't have
18 broken into her house and changed the computer
19 authentication system?

20 MR. LEVITES: Objection.

21 You can answer.

22 A Well, was the laptop in her control the
23 whole time?

24 Q I think if you read her testimony, that
25 is what she testified to.

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1 Did you learn something other than what
2 is in her testimony that led you to a conclusion that
3 it was outside of her control?

4 A No, I don't think so.

5 Q Okay.

6 Then I want to move on to opinion
7 number 5, where you say:

8 "Even if authentication had been used
9 it is more likely than not that it would
10 have been defeated by the manufacturer of
11 the subject battery pack by the time the
12 subject battery pack was installed.

13 Therefore, the fact that authentication was
14 not used is not the cause of the Marcellin
15 fire."

16 Did I read that correctly?

17 A Yes.

18 Q So, what evidence are you relying on to
19 say it's more likely than not that an SHA-1
20 authentication system would have been defeated by the
21 time the battery pack that was installed and caused
22 the fire?

23 A Well, I wasn't dealing specifically
24 with SHA-1 authentication schemes. I was just
25 relying on my experience with the tests that I ran in

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1 2010 on computers that were about the same vintage as
2 hers. And that when I put into the three versions of
3 laptop were -- three manufacturers of laptops had
4 been defeated. If there was authentication, it had
5 been defeated.

6 So, from that test, I considered that
7 the authentication defeating people while busy at
8 work and that's what I thought that would be more
9 likely than not that that authentication would have
10 been defeated anyway.

11 Q Previously, I believe you testified
12 that your tests that you did in the other case in
13 buying the same vintage laptops and buying the cheap
14 batteries established that there was no
15 authentication system on any of these computers.

16 Did I misunderstand your testimony?

17 A Yes. What I said was either there was
18 no authentication process there or it was there and
19 it had been defeated.

20 Q But you did no investigation to find
21 out if there was an authentication system programmed
22 into the those laptops?

23 A That's correct.

24 Q But it's that test that you rely upon
25 to say that it's more likely than not that had HP

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1 installed a SHA-1 authentication system, that by the
2 time the fire occurred, it would have been defeated?

3 MR. LEVITES: Objection.

4 You can answer.

5 A I didn't focus specifically --

6 You keep including the SHA-1. I was
7 talking about authentication generally. And my
8 understanding was that there's --

9 It was a large number of --

10 Not a large number, but there were
11 people trying to bypass authentication on batteries
12 that were being written about. At conferences.
13 There were discussions about them at conferences and
14 in papers and that there was a lot of that activity.
15 So, my conclusion --

16 That conclusion is based on the idea
17 that they would have figured out a way to bypass the
18 authentication. That somebody would have done that.

19 Q Is it your opinion that if that
20 authentication system was an SHA-1, that the same is
21 true?

22 MR. LEVITES: Objection.

23 You can answer.

24 A You mean, what if it wasn't a SHA-1,
25 what would it be, a SHA-2?

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1 Q If it was an SHA-1 authentication
2 system that was installed on the computer, are you
3 saying that, in your opinion, it's more likely than
4 not that that system would have been defeated by the
5 counterfeiter?

6 A I think that would have been much
7 harder.

8 Q It was more likely than not?

9 A I don't think so.

10 Q And we established through all of the
11 testimony today looking at the other -- looking at
12 the Texas Instruments 2005 report as well as the
13 actual specs for those gas gauges, that SHA-1 was
14 clearly available to HP at the time they manufactured
15 this computer for authentication system, correct?

16 MR. LEVITES: Objection.

17 A That appears to be.

18 Q That appears to be correct?

19 A I said yes.

20 Q Okay.

21 And then, finally, and I mean this,
22 opinion number 8 says:

23 "There is no scientific process that
24 explains the missing Compaq computer and
25 battery pack testified to by Ms. Marcellin.

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1 It would not have burned up to the point of
2 complete disappearance in the fire."

3 Did I read that correctly?

4 A Yes.

5 Q Okay.

6 So, first question.

7 Is it your opinion that the compact
8 computer that was, I think, 20 years old at the time
9 that Ms. Marcellin thought was in the closet was
10 actually the cause of the fire?

11 MR. LEVITES: Objection.

12 You can answer.

13 A No, not necessarily. But that there
14 was --

15 The point was she said it was there.
16 It wasn't there. It was a piece of evidence. It was
17 electrical. I mean, it had batteries anyway. And
18 so, we would have liked to look at it. But couldn't
19 find it.

20 Q Are you implying or stating an opinion
21 that the compact computer had something to do with
22 the fire?

23 MR. LEVITES: Objection.

24 A We couldn't determine whether it did or
25 did not because we didn't have it.

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1 Q Was there any evidence in the closet
2 that was found that was consistent with a battery
3 explosion from another computer?

4 MR. LEVITES: Objection.

5 You can answer.

6 A No.

7 Q Were there any cells or parts of cells
8 found that weren't identified as being part of the HP
9 laptop that exploded?

10 A No.

11 MR. LEVITES: Objection.

12 You can answer.

13 Q So, is there any scientific basis that
14 you can claim the compact computer had anything to do
15 with this fire?

16 MR. LEVITES: Objection.

17 You can answer.

18 A I can't tell whether it did or didn't
19 because I didn't get to examine it.

20 Q Okay.

21 So, you have no opinion as to whether
22 the compact computer was involved in this fire in any
23 way?

24 A That's correct.

25 I am simply saying this was a missing

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1 piece of evidence that everybody was looking for and
2 we couldn't find it.

3 Q Okay.

4 A And did you ask Mr. Gorbett about that?

5 A He said that he went through the closet
6 and didn't find anything.

7 Q So, you did talk to him?

8 A Well, I think early on I did. Maybe
9 just after the scene or the lab exam I said, "Did you
10 guys do that? How did that evidence from the closet
11 get --" He said, "Well, we looked at it at the scene
12 but we collected it anyway."

13 Q I'm sorry.

14 A I thought you said Mr. Gorbett wasn't
15 at the investigation that you went to?

16 A No, I talked to him after the lab exam.
17 And said, "I saw that stuff from the closet." And he
18 said, "Yeah, we collected that anyway." Even though
19 he looked through it when --

20 A I said, "Did you find anything
21 unusual?" He said, "No. But we collected it all and
22 brought it to the lab exam anyway." He didn't go to
23 the lab exam. I am just saying he was at the scene
24 when the scene investigation looked at the evidence
25 from the closet and then decided to collect it and

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1 bring it to the lab exam.

2 Q And so, you did have a chance to talk
3 to Mr. Gorbett but that was the only question you
4 asked?

5 A I don't know if I asked him anything
6 else. I just remembered that specific area of
7 discussion.

8 Q Do you remember asking the fire
9 investigator hired by HP to investigate the fire of
10 what he thought the cause and origin of that fire
11 was?

12 MR. LEVITES: Objection.

13 You can answer, Don.

14 A No, I don't usually ask him that. That
15 usually gets done through channels.

16 Q So, you felt that it was --

17 A I had conversations with him. I am not
18 sure I called him. I am not sure how that
19 conversation took place. But I was aware that they
20 looked at the material at the scene from the closet
21 and was aware that they collected it. And I think I
22 spoke to him. I am just trying to recall how that
23 happened, how the communication took place. I seem
24 to recall him telling me, "Yeah, we went through the
25 stuff in the closet and we didn't find anything."

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1 Q When you say "didn't find anything,"
2 you are talking about the compact computer wasn't
3 found?

4 A Anything. Anything unusual. If he had
5 found a piece of a computer, I would have been
6 interested.

7 Q Okay.

8 And you understood that there was no
9 receptacle for power in the closet, correct?

10 A Correct. I understood that.

11 Q And you understood that this compact
12 computer hadn't allegedly been used in 20 years?

13 A Also correct.

14 Q So, you have no basis to opine that the
15 compact computer had anything to do with the fire?

16 A I wasn't saying that. I just said we
17 couldn't find it.

18 Q Okay.

19 But the answer to that is you have no
20 basis to opine that the compact computer had anything
21 to do with the fire?

22 And the answer to that is that is true?

23 A That is true.

24 MR. SCHWARZ: Give me two minutes, and
25 I think I am done. So, just a two-minute

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1 break. Not long.

2 VIDEOGRAPHER: The time is
3 approximately 5:57.

4 We are off the video record.

5 (Whereupon, a short break was taken)

6 VIDEOGRAPHER: The time is 5:58.

7 We are back on the video record.

8 Q Mr. Galler, you reviewed the Allegany
9 Fire Investigator Report that had a statement from
10 Carol Marcellin as to what happened and you used some
11 of that statement in your brief description of the
12 events, correct?

13 A Correct.

14 Q And you also reviewed her two
15 deposition transcripts?

16 A I did.

17 Q Other than the compact computer issue,
18 did you find any physical evidence that contradicted
19 her version of events?

20 MR. LEVITES: Objection.

21 You can answer.

22 A I don't believe so, no.

23 MR. SCHWARZ: Thank you.

24 Those are all the questions I have. I
25 apologize for taking so long.

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1 And thank you.

2 MR. LEVITES: All right. I need to go
3 over my notes. Let's go back on at 6:05.

4 MR. SCHWARZ: Okay.

5 VIDEOGRAPHER: The time is 5:59.

6 We are going off the video record.

7 (Whereupon, a short break was taken)

8 VIDEOGRAPHER: The time is 6:13.

9 We are back on the video record.

10 EXAMINATION

11 BY MR. LEVITES:

12 Q Mr. Galler, thank you for bearing with
13 us. I just have a few brief questions for you with
14 respect to your testimony today.

15 So, when you were asked about your
16 conclusions at paragraph 20 by Attorney -- or page 20
17 rather -- by Attorney Schwarz, you were asked about
18 paragraph 5 which discusses authentication generally.
19 And Attorney Schwarz asked you about SHA-1 on
20 authentication specifically.

21 So, I want to be clear in respect to
22 this paragraph.

23 Are you saying that with respect to
24 SHA-1, you don't know if it would be defeated or that
25 it wouldn't be defeated?

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1 A I think I just don't know. I think
2 it's harder. But I just don't know if it would be
3 defeated.

4 Q Harder as in SHA-1 is harder to defeat?

5 A Correct.

6 MR. LEVITES: All right.

7 I think that's all I have for you,
8 Mr. Galler.

9 I will turn you back over to Attorney
10 Schwarz.

11 MR. SCHWARZ: No further questions.

12 MR. LEVITES: All right. Thanks, Don.
13 And thank you --

14 THE WITNESS: Oh, and I want to read
15 and sign.

16 VIDEOGRAPHER: We are still on the
17 record.

18 COURT REPORTER: One second.

19 Mr. Levites, do you want a copy of this
20 transcript?

21 MR. LEVITES: We will follow up after.

22 COURT REPORTER: Okay.

23 VIDEOGRAPHER: The time is 6:14.
24 We are going off the video record.

25 (6:14 p.m.)

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1 C E R T I F I C A T E

2

3 I, Eva Kaflinski, a Shorthand Reporter
4 and Notary Public of the State of New York,
5 do hereby certify:

6

7 That the witness whose examination is
8 hereinbefore set forth, was duly sworn, and
9 that such examination is a true record of
10 the testimony given by such witness.

11

12 I further certify that I am not related
13 to any of the parties to this action by
14 blood or marriage; and that I am in no way
15 interested in the outcome of this matter.

16

17 IN WITNESS WHEREOF, I have hereunto set
18 my hand this 15th day of April 2025.

19

20

21

22 <%signature%>

23

24 EVA KAFLINSKI

25

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1 Marcellin, Carol v. HP, Inc. And Staples, Inc.

2 Donald Galler (#7232365)

3 ACKNOWLEDGEMENT OF DEPONENT

4 I, Donald Galler, do hereby declare that I
5 have read the foregoing transcript, I have made any
6 corrections, additions, or changes I deemed necessary as
7 noted above to be appended hereto, and that the same is
8 a true, correct and complete transcript of the testimony
9 given by me.

10
11 _____

12 Donald Galler

12 Date

13 *If notary is required

14 SUBSCRIBED AND SWORN TO BEFORE ME THIS

15 _____ DAY OF _____, 20____.

16
17 _____
18 NOTARY PUBLIC

D. Galler, P.E.

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1 Jaclyn Wanemaker, Esq.

2 jwanemaker@smithsovick.com

3 April 23, 2025

4 RE: Marcellin, Carol v. HP, Inc. And Staples, Inc.

5 3/24/2025, Donald Galler (#7232365)

6 The above-referenced transcript is available for
7 review.

8 Within the applicable timeframe, the witness should
9 read the testimony to verify its accuracy. If there are
10 any changes, the witness should note those with the
11 reason, on the attached Errata Sheet.

12 The witness should sign the Acknowledgment of
13 Deponent and Errata and return to the deposing attorney.
14 Copies should be sent to all counsel, and to Veritext at
15 P1steno@veritext.com.

16 Return completed errata within 30 days from
17 receipt of testimony.

18 If the witness fails to do so within the time
19 allotted, the transcript may be used as if signed.

22 Yours,

23 Veritext Legal Solutions

D. Galler, P.E.

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1 Marcellin, Carol v. HP, Inc. And Staples, Inc.

2 Donald Galler (#7232365)

3 E R R A T A S H E E T

4 PAGE _____ LINE _____ CHANGE _____

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18 REASON _____

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20 _____

21 REASON _____

22 _____

23 _____

24 Donald Galler

Date

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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